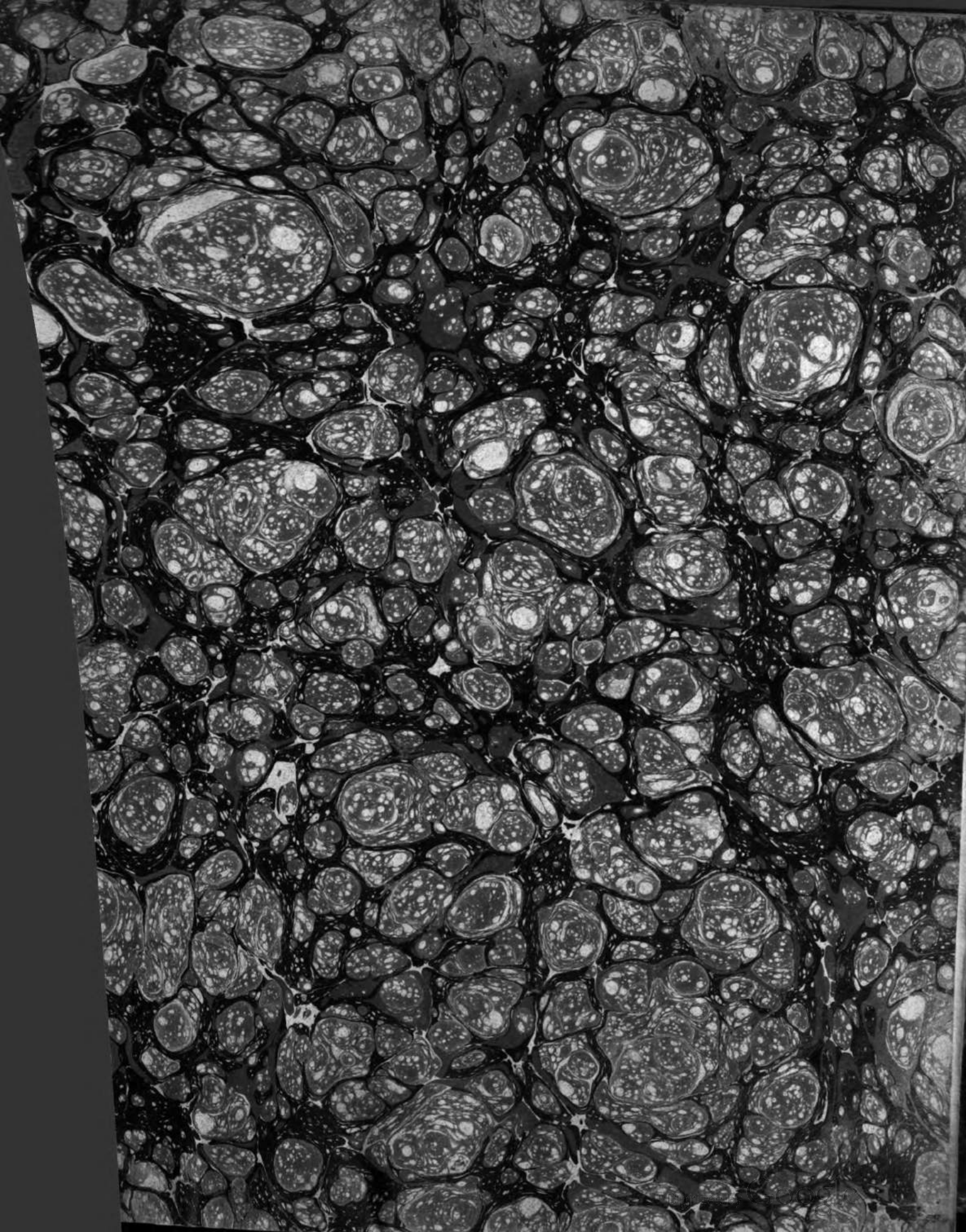


LF

584 149





With additional plates.



1

2

Painted by J. Edwards

London Published Aug^r 1866 by G. Kearsley Fleet Street

Engraved by F. Sjöström

1 *Eritillaria imperialis*
Crown imperial.

2 *Fumaria circa*
Yellow rooted Fumitory.

A
COMPLETE DICTIONARY
OF
PRACTICAL GARDENING:

COMPREHENDING ALL THE
MODERN IMPROVEMENTS IN THE ART;

WHETHER IN THE
RAISING OF THE VARIOUS ESCULENT VEGETABLES,
OR IN THE
Forcing and Managing of different Sorts of Fruits and Plants,

AND THAT OF
LAYING OUT, ORNAMENTING, AND PLANTING,
GARDENS AND PLEASURE GROUNDS:

WITH
CORRECT ENGRAVINGS
OF THE NECESSARY APPARATUS, IN BUILDINGS AND OTHER CONTRIVANCES, AS WELL AS OF THE
MORE RARE AND CURIOUS PLANTS CULTIVATED FOR ORNAMENT OR VARIETY:

FROM
Original Drawings by Sydenham Edwards.

BY ALEXANDER McDONALD, GARDENER.

IN TWO VOLUMES.—VOL. I.

London:

PRINTED FOR GEORGE KEARSLEY, 46, FLEET-STREET,
BY R. TAYLOR AND CO. 38, SHOE-LANE.

1807.

SB45
M3

P R E F A C E.

WHILE almost every other department of useful science has been arranged and brought into a more accessible and convenient form, in the shape of a Dictionary, that of GARDENING has remained nearly without assistance in this respect. The present is, however, an attempt to render so important and beneficial a branch of knowledge more easy and comprehensible, by better and more correct explanations of the various objects which it embraces; by more full and accurate descriptions of the different plants and processes; and by more clear and distinct delineations of the various modes of culture and management by which they may be raised, preserved, and brought to perfection, in the easiest and most expeditious manner. The execution of this undertaking, from the difficult and imperfect state of the art, has been attended with considerable labour and trouble; but the author hopes, from the practical knowledge which he possesses, and the various sources of information of which he has been enabled to avail himself, that it has been performed in a manner that will not be found less useful in directing the practical Gardener, than those who are not so conversant with the nature of the subject, as bringing them more fully acquainted with the various methods

that have been commonly employed, as well as those which have been suggested by modern experience.

In addition to these advantages, the Work also affords others that are probably not of less utility to the horticulturist ; those of having accurate REPRESENTATIONS of many of the most rare and curious plants that are cultivated in shrubberies, or other parts of pleasure-grounds, and in green-houses and stoves, engraved from original drawings of the plants, by the best artists, as well as of all the different improved buildings and other contrivances employed in the raising, forcing, and preserving the various sorts of fine fruits and tender vegetables, taken from those made use of in actual practice with the greatest œconomy and success.

It is therefore hoped that the work will be found deserving of attention, as furnishing a full and complete view of the most approved methods of HORTICULTURE, whether in the management of the KITCHEN-GARDEN, or in the art of FORCING the finer vegetable productions.

A

GENERAL DICTIONARY

OF

PRACTICAL GARDENING, &c.

A B R

ABELE, a general name applied to the *White Poplar Tree*. See **POPULUS**.

ABIES, the *Fir Tree*. See **PINUS**.

ABROMA, a genus comprehending a tree of the exotic kind known in the East Indies, and cultivated occasionally in the stove in this country.

It belongs to the class and order *Polyadelphia Dodecandria*, and ranks in the natural order of *Columniferae*.

The characters of which are : that the calyx is a five-leaved perianthium, having lanceolate, acute, spreading, permanent leaflets: the corolla consists of five petals, larger than the calyx, with obovate, arched, concave, and erect claws, which are hairy at the ends, and inserted at the base into the nectary; having oval, obtuse, spreading ciliate borders, which are contracted at the base into very short, ciliate, recurved, little claws, on which the principal ones are placed: the nectary is short, small, and pitcher-shaped; being divided into five segments, which are obcordate, hairy, and erect, being recurved, arched, and alternate with the claws of the petals: the stamina are five filaments, membranaceous, and very small, growing on the nectary between the emarginate trifid segments, and topped with three twin kidney-shaped antheræ on each filament: the pistillum is a subcylindrical germ, having five subulate approximating styles crowned by acute stigmas: the pericarpium is an ovate, membranaceous, veined capsule, five-winged, five-beaked, and five-celled, gaping at the top into five parts between the beaks, having the partitions folded: the seeds are many and subovate, contained within an ob-

A B R

lique membranaceous aril, and fixed in a double row to the central edge of the partitions, which is thickened and bearded longitudinally, but without any receptacle for the seeds.

The species are : 1. *A. angusta*, Maple-leaved Abroma; 2. *A. Wheeleri*, Wheeler's Abroma; the first of which only has been introduced and cultivated here.

It rises to the state of a tree, having generally a straight trunk, and branches that are adorned with some ovate, spear-shaped, acuminate leaves; and others which are angular, as those of the first year, with five or seven lobes which are acute, the anterior ones being most produced, all veined, and alternate, of a green colour on both the upper and under sides, but paler on the latter. Every part of the plant is covered by stiff, shining, decumbent bristles, of a whitish cast, scarcely observable by the naked eye, but readily separating, and adhering to the fingers without injury. The peduncles are mostly bifid, bearing two flowers of a dark purple colour, which come out on the ends of these bifid footstalks, nodding elegantly downwards, but with little or no smell; continuing to appear from June to October, and perfecting the fruit about the beginning of the latter month.

This plant grows naturally in New South Wales and the Philippine Islands, and, when cut, yields a kind of gum. It was introduced into this country about the year 1779.

The latter is a plant of the shrub kind, a native of the East Indies, having a brownish-coloured bark, and the extreme branches covered by a woolly substance.

B

Culture.—The propagation of the first, or tree kind, is by cuttings made in the spring, and planted out in pots in order to be plunged into a hot-bed, where, after being well rooted, they should be transplanted into single pots and placed in a bark-bed in the stove, where they must constantly be kept, as they require a pretty strong heat and much water. The seeds do not easily become ripe in this climate, seldom indeed arriving at a state proper for vegetating without great attention. The second sort is not yet much known or cultivated.

ABROTANUM. See ARTEMISIA.

ABRUS, *Wild Liquorice*, a genus comprehending a plant of the perennial shrubby kind, sometimes cultivated in the stove in this country.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Leguminosæ*.

The characters are: that the calyx is a one-leafed, bell-shaped, obscurely four-lobed perianthium: the teeth blunt, and the upper the broadest: the corolla papilionaceous, having the banner roundish, entire, ascending, and flatted at the sides, but longer than the wings and keel: the wings oblong and blunt; and the keel oblong, sickle-shaped, gibbous, and longer than the wings: the stamina nine filaments united into a sheath, cloven above, free at the end, unequal, and rising; with oblong erect antheræ: the pistillum a cylindrical hairy germ; with the style subulate and rising, but shorter than the stamina: the stigma in the form of a head, but small: the pericarpium a rhomblike, compressed, acuminate legume, coriaceous, bivalved, four- or five-celled, with a little subulate deflex claw; each cell containing a subglobose seed.

There is only one species; the *A. precatorius*, Jamaica Wild Liquorice.

This has a slender, shrubby, twining, branchy stalk, rising when supported to eight or ten feet in height, adorned with pinnate leaves which end abruptly, and having from twelve to sixteen pairs of small, smooth, oblong, blunt folioles, or leaflets, set close together. The flowers are of a pale purple colour, and come out in short spikes or bunches from the sides of the stalks, having the shape of the kidney bean; and are succeeded by short pods, containing in each three or four hard seeds of a bright scarlet colour, with a black speck or eye on the sides on which they are fastened to the pod.

Professor T. Marten, on the authority of Gärtner, remarks, that the legume or pod is occasionally found of an oblong form, containing six seeds scarce apparently divided by a membrane, which often disappears as the seeds become ripe. The small leaflets have the taste of liquorice, and are used for the same purposes: hence the plant seems to have obtained its name.

There are two varieties of this plant—one that has a white, and another a yellow, seed: but they do not differ from the former either in leaf or stalk. It is said to grow naturally in both the East and West Indies, as well as in Guinea and Egypt.

Culture.—The propagation of this plant is by seeds; which should be sown on a good hot-bed in the spring, being previously soaked three or four days in water, in order to promote their vegetating power. When the plants are come up about two inches in height, they should each be transplanted out into a separate pot filled with light earth, and then plunged into a bark-bed in the stove, keeping them well shaded from the sun until they have struck or taken fresh root; in which situation they must be constantly kept: after this they are to be treated as other tender plants. They mostly flower in the second year, and occasionally ripen their seeds even in this climate.

ABSINTHIUM. See ARTEMISIA.

ACACIA. See MIMOSA.

ACACIA, *False and Scarlet*. See ROBINIA.

ACACIA, *Three-thorned*. See GLEDITSIA.

ACANTHUS, *Beur's Breech*, a genus which comprehends several hardy herbaceous plants of the perennial flowering kind, which are in use for the purpose of ornament in pleasure-grounds, &c. and also one of the evergreen shrubby sort for the stove.

It is of the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a perianthium, with leaflets in three alternate pairs, unequal, and permanent: the corolla single-petalled and unequal, having a short tube closed with a beard; no upper lip; very large under lip, which is flat, straight, very broad, three-lobed, obtuse, and of the length of the upper lip of the calyx: the stamina have four filaments, subulate, shorter than the corolla, the two upper rather longer, recurved and incurved at the top: the antheræ are oblong, compressed, obtuse, the lateral ones parallel, and villous before: the pistillum has a conical germ, a filiform style of the length of the stamina, and two acute lateral stigmas: the pericarpium is a subovate pointed capsule, two-celled and two-valved, with a contrary partition, alternate claws, curved and fastened to the partition: the seed is ovate, gibbous and single, but sometimes double.

The species most commonly cultivated are: 1. *A. mollis*, Smooth Acanthus; 2. *A. spinosus*, Prickly Acanthus; 3. *A. ilicifolius*, Holly-leaved Shrubby Acanthus.

The first, or Smooth Acanthus, according to Miller, has the stem from two to three feet in height. The leaves are oblong, smooth on both



Drawn by J. J. E. Edwards.

London: Published May 1846 by G. Kearley, Fleet Street.

Engraved by F. Jackson.

Acanthus mollis
Smooth Bears Bunch.

Asclepias tuberosa
Orange Poppy.

sides and shining, from a span to a foot in length, divided deeply into opposite ovate lobes, which are bluntly toothed and finely ciliate about the edges, placed on roundish petioles, with a flat channel running along the upper surface. Both the leaves and flower-stems rise directly from the root: the former, by spreading closely upon the ground in circular clusters, produce a good effect. But though the leaves are said to be smooth, they are not without white bristles on both sides, especially along the nerves. The flowers are white, and come out from about the middle to the top of the stalk. They make their appearance in July or August, continuing in blow a month or six weeks, and then produce seed.

There is a variety of this plant in which the leaves are larger and less sinuated, the upper side shining.

The second sort, or Prickly Acanthus, has the leaves deeply jagged in very regular order; each segment is terminated by a sharp spine, as are also the petioles and the calyx of the flowers, so that the plant is troublesome to handle. In both these species the leaves and stalks are annual.

The Holly-leaved Acanthus is an evergreen shrub, which rises about four feet in height, dividing into many branches; the leaves being similar to those of the common holly both in size and shape, and also armed with spines in the same manner. The flowers come out singly in an upright raceme at the end of the stalk, are white, and shaped like those of the Common Acanthus, but smaller.

The two first are thick, fleshy, fibrous-rooted plants, which spread considerably, and penetrate the earth to a great depth. They are found in their native state in Spain, Italy, and Portugal; but grow without difficulty in the open ground in this climate.

The last is a very tender plant, which in this climate requires the constant heat of the stove to preserve it. It is a native of South America, and also of both the East and West Indies. It is retained in hot-houses for the purpose of variety.

Culture.—Both the Smooth and Prickly Acanthus are found to succeed in any common soil without much attention to the nature of the exposure, and are said by Miller to be lasting plants, which may be propagated either by seeds or the parting of the roots. If by the former method, the seed should be sown in a light dry soil towards the end of March, either in slight drills or on the plain surface, and immediately raked in. When the season proves favourable, the plants appear in May, and all the after-culture they require is to keep them clean from weeds, and, where they stand too close, to thin them out, so as to leave them about six inches apart; which is room sufficient for them to grow in until

the autumn, when they should be transplanted into situations where they are designed to remain. The first, as being the most tender, is advised to be planted in a warm border near a wall, and which, as the plants do not multiply so fast by their roots, do not require more room than about three feet; but the second, as it spreads its roots to a great distance, should have more than twice that space. From this last sort being hardy, it may be proper to be planted between shrubs to fill up vacant spaces; where it will grow without difficulty, provided the ground be light and not over wet; and when in flower will thus make an agreeable variety.

When they are propagated by their roots, the operation may be performed either in spring or autumn; but the former should only be removed in the spring; for, if transplanted in the autumn, and the following winter should prove cold, it will run the hazard of being destroyed. The roots in these cases should not be parted too small, and the plants be at once placed out where they are to remain. See **PARTING OF ROOTS**. As these plants take very deep root, when planted in wet ground, the roots are liable to rot in the winter. They have frequently been traced more than four feet: they should not therefore be wholly removed after they have been growing long in a place; but the side shoots be annually taken off, otherwise they will be apt to spread so far as to overpower the neighbouring plants or shrubs. The remaining culture is only that of affording the flowering stems due support when it becomes requisite, and carefully clearing away the decayed stalks in the autumn.

When these plants are once well established in a piece of ground, they are observed by Miller to be eradicated with great difficulty.

Both the Smooth and Prickly Acanthus are mostly kept in the nurseries for the purpose of sale.

The Shrubby species of Acanthus may be propagated with the greatest certainty by sowing seed that has been procured from abroad, in pots; to be plunged in a bark-bed in the stove until the plants are raised, when they are to be managed in the same manner as other hot-house plants. Layers and cuttings likewise sometimes succeed, when planted in pots and placed in the same situations.

ACER, the *Maple*, a genus including a great variety of hardy deciduous trees, useful both for the purposes of timber, and those of ornament in pleasure-grounds, and other situations.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order *Trihilatae*.

The characters of which are: that it has hermaphrodite and male flowers on the same tree: the

hermaphrodite calyx is a one-leafed, five-cleft, acute, coloured, flat and entire at the base, permanent perianthium: the corolla has five petals, ovate, broader outward, obtuse, scarcely larger than the calyx, and spreading: the stamina consist of eight or ten subulate short filaments: the antheræ are simple, and the pollen cruciform: the pistillum has a compressed germ, immersed in a convex, perforated, large receptacle: the style is filiform, and daily progressive: the stigmas are two or three, pointed, slender and reflex: the pericarpium is composed of as many capsules as stigmas, with one seed in each, coalescent at the base, roundish, compressed, and each terminated by a very large membranous wing: the seeds are solitary and roundish: the male flowers are the same with the hermaphrodites, except that they have neither germ nor style, but only a bifid stigma. On the first unfolding of the flower, the stigma only appears, and a few days afterwards the style. The hermaphrodite flowers in the same umbel are often of two kinds: the lower ones feminine hermaphrodites, of which the antheræ do not burst, but the pistillum grows into a fruit; the upper ones masculine hermaphrodites, of which the antheræ scatter their dust, and the pistils do not grow, but fall off.

The species are numerous; but those which have been introduced and chiefly cultivated in this country, either for the purposes of timber or ornament in pleasure grounds, are, 1. *A. pseudoplatanus*, Greater Maple or Sycamore; 2. *A. campestre*, Common or Smaller Maple; 3. *A. Negundo*, Ash-leaved Virginia Maple; 4. *A. Monspessulanum*, Montpelier Maple; 5. *A. Platanoides*, Planetree-like Norway Maple; 6. *A. rubrum*, Scarlet-flowering Maple; 7. *A. saccharinum*, Sugar Maple; 8. *A. Tartaricum*, Tartarian Maple; 9. *A. Opalus*, Italian Maple; 10. *A. Pensylvanicum*, Pennsylvanian Mountain Maple; 11. *A. Creticum*, Cretan Maple.

The first, or Great Maple, has the leaves divided towards the base into three large and two small lobes, the edges being unequally serrated, the racemes pubescent and hanging down, the flowers of a yellowish green colour, and the wings of the capsules erect. It grows to a great height, often with a clear stem or bole, and spreading top. It comes early into leaf, as about the middle of April; and these at first have a pleasing green colour, but, from their exuding a clammy juice, are liable to be soon eaten by insects; which lessens its value for purposes of ornament. The bunches of flowers are in full bloom about a fortnight after the first appearance of the leaves, but from their bad colour produce little ornamental effect.

This tree was formerly much employed in planting walks, avenues, &c. but has lately given

place to others of the more ornamental kind. It is probable, however, that near the sea-coast it may be planted with advantage, either alone, or for the purpose of sheltering other trees, as it is known to withstand the attacks of the sea air with peculiar hardness. On being wounded, it exudes a great quantity of liquor, of which good wine is made. There are two varieties of the Great Maple or Sycamore:—one with broad leaves and large keys—the other with variegated leaves. The latter, when blended in large plantations, afford a pleasing variety. This tree is frequently known by the names of Sycamore, Mock Plane, and Plane Tree.

In the second, or Common Maple, the bark is rough and deeply fissured, the leaves growing in pairs on long petioles; being divided about half way down into three lobes; the side ones subdivided into two smaller ones, and the middle one into three which are obtuse. The flowers are greenish, hanging in thin, loose, short clusters at the extremities of the branches. The peduncles, when broken off while young, are lactescent. The receptacle of the flower is spongy, and divided into eight rays, a stamen being placed between each. This is a tree of much humbler growth than the former, and by no means so ornamental: it may however be admitted in extensive plantations.

The third sort, or Ash-leaved Virginia Maple, is a very strong-shooting tree of quick growth. It is well calculated, on account of its pale green leaves, which vary in form from those of the other species, being composed of distinct lobes, to constitute a pleasing variety in plantations; but they fall soon in the autumn. It should be made use of in situations that are not much exposed to the winds, as it is said to be apt to be split by them. The wood is soft and brittle.

The Montpelier Maple is a tree that grows about twenty feet in height. The leaves resemble those of the Common Maple, but are of thicker substance and not so large, have a shining green colour, and continue their verdure late in the autumn; which renders the tree more valuable. This sort is not common at present in this country. The blow of the flowers is soon over, and has not much beauty. It is occasionally succeeded by ripe seed. This tree is common in the southern parts of France and in Italy.

The Norway Maple rises to a large size. The leaves are smooth, and of a shining green colour, fully as large as those of the first kind, and, from the tree abounding in a sharp juice of a milky appearance, seldom eaten or much injured by insects. They are more ornamental than those of the Sycamore; the trees having in the spring, when the flowers are in full blow, from their fine yellow colour, a most beautiful effect. It is

met with in the mountainous parts of most of the northern states of Europe.

There are two varieties of the Norway Maple;—one with variegated or striped leaves, and the other with cut leaves.

The Scarlet-flowering Maple is a dioecious tree, the leaves of which are composed each of five sharp-pointed lobes, which are slightly indented or serrated: they are smooth, of a pale green on their upper surface; and sea-green colour underneath; and they grow on long, simple, taper, reddish footstalks. The flowers come out in clusters from the sides of the branches before the leaves, and have only six stamina. They appear in April, and the seeds ripen in June.

There are two varieties of it;—the Virginian Scarlet-flowering Maple, and Sir Charles Wager's Maple. Both of them are propagated for the sake of the flowers, which are of a scarlet colour. The sort called Sir Charles Wager's produces larger clusters of flowers than the other; on which account it is most in esteem.

The Sugar Maple is a large-growing tree, sometimes arriving at the height of forty feet, and has broad thin leaves divided into five principal parts, which are again indented or cut at the edges into several acute segments. Their surface is smooth, of a light green colour, whitish underneath; and grow on pretty long footstalks. The flowers come out in the spring, about the time of the Norway Maple; and are succeeded by seed, which sometimes ripens here. In America, the inhabitants tap this tree in the spring, and boil the liquor, which affords an useful sugar. The Sycamore, the Ash-leaved and the Norway Maples also abound with a saccharine juice, from which sugar might probably be prepared with advantage.

The Tartarian Maple grows to upwards of twenty feet in height. The leaves are heart-shaped, undivided, and their edges unequally serrated. The flowers come out from the wings of the leaves in bunches of a longish form, appearing early in the spring, and are occasionally succeeded by ripe seed in this climate. It is a native of the southern parts of Russia.

The Italian Maple has a trunk ten feet in height, straight, branching, and covered with a gray bark. The branches are flexible. The leaves are middle-sized, thin, three- or five-lobed, toothed, and rounded. The flowers are in a very loose pendent raceme; on peduncles very long, branching and bending: they are larger than those of the other sorts, composed of five lanceolate petals, yellowish and veined. The calyx is very small, falling a long time before the corolla. The stamina are eight in number, and twice as long as the corolla; the wings of the seed not adhering to the

sides of the capsule, as in the other species, but placed at the top, and only a little separated from each other. It is common in many parts of Italy. It is a lofty tree, and from its having a spreading head adorned with large and beautiful foliage, deserves the attention of ornamental planters.

The Pennsylvanian Maple is but a small tree, which in some situations may be considered rather as a shrub. It sometimes grows to the height of about fifteen feet, with a slender stem, covered with a whitish bark, and sending forth several red branches. The flowers are in long pendulous racemes, of a greenish yellow colour. The seeds generally fall off before they are ripe. It is a native of Pennsylvania.

The Cretan Maple is a low tree, having much resemblance to the Montpellier sort. The leaves while young are ovate, but afterwards have much similarity to those of ivy, being only of a much thinner texture, and having their petioles covered by a soft hairy down.

There is a variety of this tree in which the leaves continue green most part of the year when well sheltered. It is denominated the Evergreen Cretan Maple.

Culture.—Almost all the sorts and varieties of the Maple are of easy cultivation, each of them being capable of being raised from seed, and many of them by layering, cuttings, and budding. They thrive in most soils and situations, provided they be not too moist: the common sorts succeeding the best in such as are deep and inclined to moisture, but not hard or stiff; and the American kinds in those that have a dry and rather close state of mold.

In propagating them by seeds, as they do not in all the sorts ripen well in this country, the best way is to procure them from the places where the trees grow naturally. A cool shady place is the most suitable for this purpose. The mold being made fine, and beds marked out four feet wide, with length proportionate to the quantity; in these the seeds are to be regularly sown in the autumn, sifting over them the finest mold to the depth of half an inch. When the plants are come up, they must be kept clean from weeds, and frequently watered in the summer. In the spring following, the strongest may be drawn out, and planted in nurseries, in rows two feet asunder, and at the distance of a foot from each other in them, leaving the others to gain strength. In the second spring these also must have the same culture; and they may remain in the nursery, without any other trouble than keeping the ground clean from weeds in the summer, digging between the rows in the winter, and taking off all strong and irregular side shoots, till they are fit to be planted out. The trees raised in this way

grow faster, and arrive at greater heights, than those from layers: but they do not in general produce such quantities of flowers; which makes the latter method more eligible for those who want these plants for low shrubbery uses. In these cases they should always have four or five years growth before they are finally planted out.

It is, however, advised by some, that the seeds of the Common and Norway Maples should not be put into the soil immediately after becoming ripe; but be dried and preserved in sand till February or March, as the season may prove favourable; when they may be sowed in drills or beds eighteen inches broad, with alleys the same width, and covered three-quarters of an inch thick with mold. In the following February, or March, the alleys should be dug, and the roots of the plants cut about five inches under ground, which may be easily performed by means of a sharp spade, drawing the plants out where they stand too thick. These may be replanted in any good mellow soil, in rows eighteen inches asunder, and eight or nine inches from each other in the rows. In October, when the plants in general will be about two feet high, raise both the seedlings and those that were transplanted, shorten their tap-roots, cutting off any cross lateral branches, and remove them into rows two feet and a half apart, and fifteen inches distant in them, in order that they may continue for a year or two. Remove them again at the same season the succeeding year, and plant them in rows five feet asunder, and two and a half from each other, that they may continue four years. These will now be from twelve to fifteen feet high; and if required of a still larger size, they may be removed, and planted again eight or ten feet asunder; when any time after two, and not exceeding eight or ten years, they may be finally planted out where they are to remain. The use of removing these trees frequently when young is, that they are apt naturally to grow with tap roots; which this management prevents, and makes the plants root better, and become more easy in their growth when transplanted at a large size.

Though all the species of this genus are capable of being propagated by layers, it is never practised for the Common Maple. In this method the young shoots may be laid down at any time in the autumn, winter, or early in the spring; but the first is probably the best. By the same time in the following year they will have struck root, and have become good plants; when the strongest may be set out in the places where they are to remain; while the weakest may be planted in the nursery, in the same manner as the seedlings, for a year or two, in order to gain strength.

In propagating by cuttings, though all these trees are capable of it, it is a method chiefly

practised on the Ash-leaved and Norway Maples, as they take root this way more readily. The cuttings should be taken from the bottom parts of the last year's shoots early in October, and be planted in rows in a moist shady place. In the spring and summer following they should be watered as often as dry weather makes it necessary, and be kept perfectly clean from weeds. In the autumn they will be fit to remove into the nursery; though, if the cuttings are not planted too close, they may remain in their situations for a year or two longer, and then be finally set out, without the trouble of being previously planted in the nursery. These trees are also to be raised by budding, grafting, and inarching. But as the other methods are more eligible, these are seldom or ever practised, except for the variegated sorts and the large broad-leaved kind. The latter is indeed to be continued in no other way than by budding it on stocks of the Common Sycamore; as the seeds, when sown, afford only the Common Sycamore. But the seeds of the variegated kinds produce variegated plants; which renders the propagation of these sorts very expeditious, where plenty of seed can be had.

But where it is not to be obtained, in order to propagate these varieties, recourse must be had to budding; in performing which, some plants of the Common Sycamore, one year old, are to be taken out of the seed-bed and set in the nursery in rows a yard asunder, and the plants about a foot and a half distant from each other in the rows. The ground must be kept clean from weeds all summer, and be dug, or, as the gardeners call it, *turned in*, in the winter; and the summer following the stocks will be of a proper size to receive the buds, which should be taken from the most beautifully striped branches. The best time for this operation is about August; as, if it is done earlier, the buds will shoot the same summer, and when this happens a hard winter is apt to kill them. Having budded the stocks the middle or latter end of August, the eyes, or buds, being inserted on that side of the stock which faces the north, towards the beginning of October the bass by which it was tied may be removed, as it will begin to pinch and confine the bark, as well as the bud, too much. In the spring, just before the sap begins to rise, or the trees begin to shoot, the head of the stock should be cut off in a sloping direction just above the inserted bud: by these means, and that of constantly rubbing off such shoots as come from the stocks, the shoot from the inserted bud will be rendered more strong and healthy. The trees thus raised may remain in their situations for a year or two longer, or be transplanted into the places where they are intended for, in the autumn or spring following; care being constantly taken to keep the land well

dug between the rows, so as to prevent their being injured by the growth of coarse weeds, and the side buds trimmed from the stocks.

The autumn is upon the whole the best time for planting these and other deciduous trees, when they are strong and well rooted; yet when young they are apt to be injured by frosts, and thrown out of the ground in severe winters when planted at that season of the year.

The Common, Sugar, Norway, and Ash-leaved Maples, from the tallness of their growth, their having large spreading heads, and exuberant foliage, are proper for large plantations; and from the leaves being of different sizes, shapes, and colours, they make a considerable variety, when mixed with other trees of similar growth, especially if the variegated sorts be employed: besides, their large pendulous branches of flowers, though deficient in colour, are not without their beauty, especially in those of the Norway kinds. They are also useful in forming detached clumps, rural walks, groves, avenues, wherever shade is wanted.

ACETOSA, *Sorrel*. See **RUMEX**.

ACHANIA, a genus of plants which furnishes three species of shrubby exotics for the stove, but only one that is much cultivated.

It belongs to the class and order *Monadelphica Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx has a double perianthium, the outer having many leaves, and the leaflets being linear, permanent, and slightly coalescing at the base: the corolla is subclavate and convoluted; and the petals are five, obovate, oblong, erect, with a lobe at the base on one side, involving the column of stamina: the stamina are numerous filaments, coalescing into a writhed tube, longer than the corolla, free at top, and capillary: the antheræ are oblong: the pistillum has a subglobular germin: the style is filiform, of the same length with the tube of the stamina, ten-cleft at top, the segment spread, the stigmas capitate: the pericarpium is a subglobular, fleshy, five-celled berry: seeds are solitary on one side, convex and angular on the other.

The species principally cultivated is the *A. Malvaviscus*, Scarlet Malaceous Achania, or Bastard Hibiscus.

It has a woody stem, branching, ten or twelve feet in height: the leaves are cordate, angular, and acuminate, scarlet flowers coming out from the wings of their stalks: the petals are contorted, and succeeded by round berries of a scarlet colour and clammy feel. The plant is a native of South America and the West Indies. It flowers the greatest part of the year.

Culture.—Plants of this sort may be raised

from seed, when it can be procured perfectly ripe, by sowing it thinly in pots to the depth of about half an inch, in good, clean, light, rich mold; and afterwards plunging them into a gentle hot-bed. After the plants have come up to the height of two or three inches, they should be pricked out into other separate pots, be lightly watered, and again plunged into the hot-bed till fit to be removed into larger pots, where they are to remain.

As the seeds seldom ripen in this climate, it is probably a more expeditious method to propagate them by cuttings from the young shoots in the spring; which should be planted in pots of the same sort of earth as for the seeds, and be plunged into hot-beds of moderate heat, the air being kept from them at first as much as possible. In this way they soon take root, and should afterwards be gradually inured to the action of the open air in the green-house during the summer.

The plants, from their tender nature, require the constant assistance of the stove to preserve them from the effects of cold in this climate during the winter season; and when kept in warmth during the summer they flower better, and sometimes ripen their fruit. They may, however, be occasionally placed out in warm sheltered situations in the hot summer months, though with this management they seldom flower well.

And they must have the same attention and management bestowed on them afterwards as is necessary for other sorts of stove plants.

ACHILLEAS, a genus comprehending plants of the *Milfoil*, *Yarrow*, and *Sneeze-wort* kinds, which are fibrous-rooted herbaceous perennials of hardy growth.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the common calyx is ovate, and imbricated with ovate, acute, converging scales: the compound corolla is radiate: the hermaphrodite corollæ are tubular in the disk, and the females ligulate, being from five to ten in the ray: the proper corolla of the hermaphrodites is funnel-shaped, five-cleft, and spreading; the female obcordate, spreading, and trifid, the middle cleft being less than the others: the stamina in the hermaphrodites consist of five capillary, very short filaments, and the anthera is cylindrical and tubular: the pistillum in the hermaphrodites has a small germ, a filiform style of the length of the stamina, and an obtuse emarginate stigma: in the females, a small germ, filiform style of the same length as in the others, and two obtuse reflex stigmas: there is no pericarpium: the calyx is scarcely changed: the receptacle is filiform, elongate as the disk of the seeds, ovate, and twice the length of the calyx:

the seeds are solitary, ovate, furnished with flocks, but without down; and the receptacle is chaffy and elevated, the chaffs being lanceolate, of the length of the florets.

The species are numerous; but those mostly cultivated in the garden, and employed as ornamental plants, are, 1. *A. Multiflorum*, Common Milfoil or Yarrow; 2. *A. Ptarmica*, Common Ptarmica or Sneezewort; 3. *A. tomentosa*, Hoary Yellow Milfoil; 4. *A. Clavennæ*, Silvery-leaved Milfoil; 5. *A. nana*, Dwarf Hoary Milfoil; 6. *A. Ægyptiaca*, Egyptian Hoary Sneezewort; 7. *A. abrotanifolia*, Southernwood-leaved Milfoil; 8. *A. macrophylla*, Long Feverfew-leaved Sneezewort. The three first are, however, in most esteem as garden plants.

In the first species, the root is perennial and creeping, the stem rising to the height of a foot or more; the leaves alternate, doubly pinnated, the lobes cut into narrow segments; the flowers in close broad-topped corymbs standing on hoary peduncles. It flowers from June to September.

The variety with purple flowers of different shades is the sort most generally cultivated in gardens for the purpose of ornament.

The second has likewise a perennial root, with the stem reddish, often rising to two feet in height; the leaves alternate, spear-shaped, with the edges sharply serrated; the flowers in loose, compound, upright, villous, leafy corymbs, at the ends of the stems, of a whitish yellow colour.

The variety with double flowers, usually known by the titles of Double Ptarmica or Bachelors' Button, is that which is mostly cultivated. It flowers in July and August, or later.

In the third, the stems are many, leafy, and not more than a foot in height; the leaves pinnated, rough, and hoary; the lobes narrow and indented; the flowers of a fine yellow colour, continuing long in blow. It is a native of Spain, and the southern parts of France; but capable of being cultivated in the open air in this climate.

The fourth species is a plant of but humble growth, seldom rising more than six inches in height. The leaves are pinnatifid, plain, obtuse, and hoary, having a silvery appearance. The flowers are of a white colour, and grow in flat corymbs. They appear in June and July. The plant is a native of the Alps.

The fifth is a very small plant; the stem being frequently bent: the leaves are pinnated, indented, and downy; the umbels are of a white colour and globular form. It is of hardy growth and easy culture.

The sixth is a plant that rises to the height of from nine inches to a foot. The leaves are pinnated, having the lobes obtusely spear-shaped,

and indented at the edges; they have a silvery appearance, and remain all the year. The flowers are produced in corymbs on the tops of the stems, coming out from June to September, and some of them frequently continuing most part of the winter. From the plant growing close and low, it has at all seasons a pretty effect. It is a native of the Levant, but has been long cultivated here.

The seventh species grows to the height of two feet and a half, having pinnated supra-decompound hoary leaves that are cut into very narrow segments, and which stand remote. The flowers are of a yellow colour, appearing in June and July.

And in the eighth there are many stems which rise to the height of nearly three feet, having on their tops loose branching corymbs of white flowers. The leaves are pinnated and deeply serrated, the outmost wings the largest. It is a native of the Alps, extremely hardy, thriving well in open exposures, in almost any sort of soil. The flowers appear in July and August.

Culture.—These plants may be propagated in different ways according to their kinds; as by parting the roots, cuttings, slips, and seeds.

The first method may be practised on all the sorts, either in the autumn or spring season.

In some of them, as the Egyptian sort, which seldom produces perfect seed in this climate, it may be performed by cuttings or slips, which should be planted out in a warm, rather dry, shady border, during the summer season.

In those sorts that ripen their seed in a perfect manner, the best method is by sowing it in a bed of fine light mold about the middle of March, or in the beginning of April, covering the seeds in very thinly. The plants will in general soon appear, and be ready to be transplanted into the situations where they are to remain, in the following autumn. In this way, when not injured by the severity of the winter, they mostly flower the succeeding spring.

The Egyptian and Silver-leaved species require dry soils and warm sheltered situations; as the first is liable to be destroyed in severe winters by the frosts in this climate, and the roots of the latter to be destroyed by too much moisture in the same season. In exposed situations it may be advisable to have a few plants of the former sheltered under a frame in pots. As most of the other sorts are sufficiently hardy, they require but little attention in their cultivation. They may be employed with good effect in the fronts of borders and other parts, in shrubberies and other pleasure grounds, as by the woolly appearance of the leaves in many of the kinds, and the long continuance of the flowers in others, they often form an agreeable diversity and pleasing contrast.

ACHRAS, a genus comprehending the Sapota Tree or *Mammee Sapota*, an exotic, which in its native situation rises to the height and size of a large tree; but when cultivated in the stove in this climate seldom exceeds that of a shrub.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Dumoseæ*.

The characters are: that the calyx is a perianthium, consisting of six ovate, concave, erect leaflets, the outer broader and shorter, and the inner coloured: the corolla is one-petalled, ovate, of the same height with the calyx, with the border cut into six subovate flat divisions, and scales at the jaws of the corolla, equal in length to the divisions, narrower, spreading, and emarginate: the stamina have six short awl-shaped filaments at the jaws of the corolla, alternate with the divisions, bent inwards: the antheræ are sharp: the pistillum has a roundish, flattened germen: the style is awl-shaped, and longer than the corolla; and the stigma is obtuse: the pericarpium is a globose, very succulent pomum with twelve cells: the seeds are solitary, ovate, shining, scarred on one side, and pointed at the base.

There are several species; but those cultivated in the stove in this country are, 1. *A. Sapota*, Common Sapota Tree; 2. *A. Mamosa*, Mammee Sapota.

The first is a tall tree without branches to a considerable height; spreading out in the head with numerous small branches growing rather thick and close together: the bark is of a darkish gray colour, thick, rough, and chopped. The leaves are large, oblong, and ovate. The fruit is round and smooth, bigger than that of the quince; the rind thick, gray, becoming yellow and tough when ripe: the flesh is also of a yellowish colour, having two large rough flat stones in the middle: the taste and smell are very fine.

The second is likewise a tall straight-growing tree with ash-coloured bark, the branches coming off on every side so as to constitute a regular head: the leaves are spear-shaped, nearly a foot in length, having often the breadth of three inches in the middle: the flowers are cream-coloured, and succeeded by large oval or top-shaped fruit, with a brownish cuticle or covering, beneath which is a thickish pulp of a russet colour and luscious taste, frequently called, from its resemblance to the quince, Natural Marmalade. This tree is often cultivated in the gardens in many of the West-India islands for the sake of the fruit.

Culture.—These trees are not capable of being preserved in this climate unless attended to with great care, and kept in the warmest and best regulated stoves. Each of these species may be propagated by planting the stones: but

as they do not keep well when taken out of the fruit, this should be done in their native situations as soon as they are removed, in tubs of good mold placed so as to have the advantage of the morning sun, the earth being kept constantly well watered. On the plants appearing they should be well protected from the attacks of insects, and from being injured by weeds. When about a foot in height they may be sent to this country in the early part of the summer, in order that they may make good root before the winter sets in. A little water should be occasionally given them in their passage while in a hot climate; but as they advance towards a cold one this should be applied more sparingly, care being taken to guard them well from being destroyed by the salt water. On their arrival they should be carefully removed from the tubs, with a little of the mold about their roots, and placed in pots of fresh earth, in order to be plunged in moderate bark hot-beds, shading the glasses when the weather is hot with mats until they have taken new root, not giving them too much water at first, particularly if the earth they came in be moist, as too much water injures the plants before they are well rooted; but afterwards they should be often refreshed with water, especially in hot weather. And they should have the air freely admitted to them, in order to prevent the attacks of insects upon them. When insects seize them they should be carefully removed by means of a sponge, otherwise the plants will be greatly injured in their growth.

During the winter season they are to be planted in the warmest parts of the stove, and in very cold weather have but little water given them, though occasionally refreshed with it when the earth is become dry. When they retain their leaves during this season, a larger proportion of water will, however, be necessary than where the contrary is the case. As the plants advance in size they are to be removed into larger pots; but care should be taken not to overpot them, as by that means they are very liable to be destroyed.

Plants of this kind have but little merit, except for the variety which they afford, as it is necessary to keep them constantly in the heat of the stove.

ACHYRANTHES, a genus the plants of which are mostly herbaceous, somewhat shrubby, perennials of the tender exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Amaranthi*.

The characters of which are: that the calyx consists of an outer perianthium, that is three-leaved, lanceolate, acute, permanent; and of an inner one that is five-leaved and permanent: it has no corolla: the nectarium has five valves

surrounding the germ: bearded at the tip, concave and caducous; the stamina are filiform, the filaments of the length of the corolla, and the antheræ are ovate and incumbent: the pistillum has a superior turbinate germ: the style is filiform, of the length of the stamina, and the stigma is bilid and villous: the pericarpium is a capsule, roundish, one-celled, not gaping; and the seed is single and oblong.

There are several species, but only one that is much cultivated by gardeners. This is the *A. aspera*, or Rough Sicilian Achyranthus.

It is a plant which rises with an erect stem to nearly three feet in height, having oblong pointed leaves, the flowers coming out from the extremities of the branches in long spikes. The seed, which is inclosed in a sort of chaffy covering that can scarcely be called a capsule, is ovate, oblong, nearly cylindric, having a sort of small beak on the side, and is of the colour of honey. The flowers appear in July and August, and the seeds become ripe about September.

Culture.—It is capable of being raised, either in the spring or autumn, from seed by means of a hot-bed, and also by cuttings; but the first is by much the best method, as being more certain. When the plants are become strong, they may be removed into the open ground in pots during the summer months; and when set into a warm greenhouse during the winter season they may be preserved for two or three years or longer. This plant is cultivated more for the sake of variety than the purposes of ornament, as it possesses but little beauty.

ACONITUM, *Aconite*, *Monk's-hood*, or *Wolf's-bane*, a genus that comprehends several plants of the hardy herbaceous perennial kind, with tuberous or fibrous roots.

It belongs to the class and order *Polyandria Trigynia*, and ranks in the natural order of *Multifloræ*.

The characters are: that it has no calyx: the corolla consists of five unequal petals opposite in pairs; the highest being helmet-tubed, inverted, and obtuse; the two lateral ones broad, roundish, opposite, and converging; and the two lowest oblong and bending downwards: the nectaries are two, concealed under the first petal, fistulous, nodding, with mouth oblique, and the tail recurved, sitting on long subulate peduncles: in the same circle with the nectaries there are six little, very short, coloured scales: the stamina are subulate filaments, very small, broader at the base, inclining towards the first petal: the antheræ are erect and small: the pistillum has from three to five oblong germs, ending in styles the length of the stamina: the stigmas are simple and reflex: the pericarpium has as many capsules as the styles, ovate, subulate, straight,

one-valved, gaping inwards; the seeds are many, angular, and wrinkled.

The species generally cultivated in pleasure-grounds for the sake of ornament are: 1. *A. Napellus*, *Napellus*, *Common Monk's-hood*, or *Blue Aconite*; 2. *A. Lycotomum*, *Great Yellow Monk's-hood*, or *Wolf's-bane*; 3. *A. Anthora*, *Salutary Monk's-hood*; 4. *A. Pyrenaicum*, *Pyrenean or Fennel-leaved Monk's-hood*, or *Wolf's-bane*; 5. *A. Cammarum*, *Purple Monk's-hood*, or *Wolf's-bane*; 6. *A. album*, *White Monk's-hood*, or *Wolf's-bane*; 7. *A. variegatum*, *Variiegated or Small Blue Monk's-hood*; 8. *A. uncinatum*, *Hooked American Monk's-hood*.

In the first of these species the root is simple, woody, tuberous, unequal: the stem is erect, firm, covered with leaves eighteen inches in height, and terminated with a thick cylindric spike of flowers. The leaves have a blackish-green colour, are firm and shining, being three-parted in the middle lobe, and deeply two-parted in the side ones; the small divisions acutely but unequally trifid. It is a highly poisonous plant; which renders its culture in the garden less attended to than would otherwise be the case. It comes into blow about August.

The variety with long spikes of blue flowers is the most usually met with in garden culture. It grows to the height of four feet, and has spikes two feet or more in length. It flowers in May and June, and the seed becomes ripe about September. There is also a rose-coloured, a white-flowered, and a variegated blue and white variety of *Napellus*.

The second has the stem eighteen inches high or more, leafy, and very little branched. The leaves are broader than in the other sorts, cut half way into three lobes, which are doubly trifid, the side ones being very deeply two-parted. The spike is simple, with few flowers. It flowers about the middle of June, and, if the season be not too hot, will continue in blow till August.

There is a variety of this species with large palmated leaves, which are smooth.

In the third species, the root consists of from two to four angular fleshy bulbs. The leaves have a furrow along the middle, and are narrow, three-parted, the side-lobes being deeply two-parted, the middle one doubly trifid, with long sharp gashes; the side ones being more irregular. The stem is from a foot to eighteen inches in height, and a little branching. The peduncles sustain one or two flowers. The seeds are wrinkled and multangular. It flowers about the middle of August, and often continues in beauty till the middle of September: the flowers are not so large as those of some of the other sorts, but, being of a sulphur-colour, make a pretty appearance in the borders of the flower-garden.

In the fourth, the stem rises to the height of about four feet: the leaves are divided into long segments, deeply jagged into many narrow parts which lie over one another like scales, having long spikes of pale yellow flowers of a middling size. It may be allowed a place among shrubs, or in such parts of the garden as are not much frequented by young children.

The fifth species has a tall stem, frequently rising to the height of six feet: the leaves are divided into numerous wedge-shaped lobes, which are cut into many acute parts: the flowers are large and numerous, and of a pale blue colour.

The varieties chiefly cultivated are: the Wedge-lobed Purple, the Wedge-lobed Blueish Purple, and the Wedge-lobed Deep Blue Aconite.

The sixth sort has a stem rising sometimes nearly to the height of the former, with palmated three-parted leaves acutely divided, and large white flowers.

The seventh species seldom rises to more than the height of two feet: the leaves are many-parted, the segments being half cut through, and the upper ones the broadest; the spikes of flowers small, and variegated with blue. It flowers about the end of June.

In the eighth the leaves are three- or five-lobed, angular, and toothed: the flowers are blue, and come out singly, having the top of the helmet hooked, extending straight further than the tail.

All the species have perennial roots; but the stems and leaves are annual, rising in the spring, and decaying in the autumnal month.

Culture.—These are plants that require little difficulty in their culture. All the species and varieties may be easily raised from seed, as well as by parting the roots. In the first method the seeds should be sown in autumn, on good common earth, in a rather shady situation: this is said to be preferable to sowing them in the spring months, as where that mode is practised they seldom come up till the year after, whereas in this they commonly appear in the spring following. They are to be kept clean from weeds during the ensuing summer months, and must have water given them occasionally when the season turns out dry, until the plants are in a state to be pricked or planted out in a bed or border, which should be done at the distance of about fourteen inches each way, taking the plants up carefully, and watering them as often as may be necessary until they have taken fresh root. After this they demand no other management, but that of keeping them clean from weeds, till they are ready to be finally planted out in the succeeding autumn. They afterwards require little attention, except that of cutting down and clearing away their stems and other parts every autumn.

Where the method by parting the roots is practised, it is best performed in October, or towards the month of March. In the common sorts, every piece that possesses a bud or eye will readily grow and produce a plant, on being set in good earth.

As these plants, especially all the common kinds, delight in such shady situations as are not much exposed to the drop of trees, they are well calculated for those large borders, clumps, and other compartments in ornamented grounds, that are not much overhung by trees or tall-growing shrubs, as in such exposures they continue much longer in flower. Some of the blue sorts will likewise thrive under trees, where they do not stand too closely together. From their containing large handsome spikes of flowers that continue long in blow, and their having much diversity in their leaves, they afford considerable variety when planted out in such situations as mentioned above. There is, however, one objection to them, which is their possessing poisonous qualities, which render them improper in places where children are much admitted.

Most of the blue sorts have been long in cultivation, and almost all the other kinds may be procured from the nurseries and flower-gardens.

ACORN, the seed or fruit produced by the different species and varieties of the oak. It is a sort of nut, from which trees of this kind are mostly raised. See *QUERCUS*.

ACORUS, a genus comprehending hardy, herbaceous perennials, of the Sweet Rush or Flag kind, cultivated for the sake of their fragrant aromatic qualities.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Piperitæ*.

The characters are: that the calyx is a cylindric, simple spadix, covered with floscules, without spathe or perianthium: the corolla is composed of six petals, obtuse, concave, loose, thicker at the top, and in a manner truncate: the stamina are thickish filaments, somewhat longer than the corolla; and the antheræ are thickish, twin, terminal, and adnate: the pistillum is a gibbous germ, rather oblong, and of the length of the stamina, without style: the stigma is a prominent point: the pericarpium is a short triangular capsule, attenuated to both ends, obtuse, and three-celled: the seeds are many, and ovate-oblong.

The species are two: 1. *A. Calamus*, *Calamus aromaticus*, Common Sweet Rush; 2. *A. gramineus*, Grass-leaved Sweet Rush, or Chinese Sweet Grass.

The first is a plant of the aquatic kind, being found to grow naturally in watery situations in

different parts of the kingdom. It is sufficiently distinguished by its long, narrow, sword-shaped leaves, which are of a bright green colour, waved along one of the edges, and when broken yielding a strong aromatic scent; and also by its oblong, cylindric spike of flowers, coming out from the side of the stem at the edge of the leaf, which is generally single, though sometimes double. The root is long, cylindric, tuberous, spongy, marked with rings, and putting out abundance of fibres, which are the proper roots of the plant. It flowers in the months of June and July.

The second sort has the roots in tufts, with a few thready fibres: the stem is scarcely any, or very short: the leaves are equitant, erect, somewhat alternate, linear-sword-shaped, pointed, a little thickened at the margin, smooth, evergreen, a span long, edged at the base, with a white, pellucid, shining membrane: the stalk like the leaves, but a little shorter, erect, somewhat thickened under the spadix, afterwards narrower, and altogether leafy; about equal to it in length, scarcely longer. The spadix, arising laterally from the stalk near its top, is erect, cylindric, obtuse, being entirely covered with yellowish-green sessile florets.

The whole plant has an aromatic smell when bruised, much resembling the Sweet Flag, from which it is distinguished by the shortness of that portion of its stalk which is above the spadix, as well as by all its parts, except the florets being five times smaller than in that plant. Professor T. Martyn observes in his Dictionary, that it is probably a native of China, being at least frequently cultivated, for the sake of its smell, in pots, about the habitations of the Chinese.

Culture.—The first of these plants requires little trouble in its cultivation, as it may be propagated by its creeping roots with great facility. It should be transplanted from its natural situation in the autumn or early spring months, and placed in such moist ground as that its roots may be well supplied with water, for where this is not the case it seldom produces flowers. The situation should likewise be open, as it does not thrive well under the shade of trees.

It has been suggested that the root of this plant might be employed as a spice, when reduced to the state of a powder; but it is chiefly cultivated on account of the fine smell which it affords, and the ornament of the flowers.

The second, or Chinese sort, may be propagated by parting the roots, and placing them in pots of good mold in dry stoves, where they will require only a moderate degree of heat. This species is cultivated for variety, as well as the fragrant odour which it affords.

ACROSTICHUM, a genus including various

plants of the fern kind, some of which may be cultivated for the purpose of ornament and variety.

It belongs to the class and order of *Cryptogamia Filices*.

The characters of which are: that the fructifications cover the whole inferior surface of the frond or leaf.

The species are extremely numerous: but those hitherto cultivated for the purposes of ornament in open exposures are: 1. *A. septentrionale*; 2. *A. australe*; 3. *A. rufum*; 4. *A. Maranticum*; 5. *A. illyense*.

The first grows in tufts somewhat resembling rushy grass. The fronds are from one to four inches in length; commonly a little curved, narrow, entire at the base, but dilated towards the extremity, and divided into two or three lanceolate segments, which are again irregularly cut into two, three, or more, smaller recurved ones. The fructifications first appear in small lines, but in the adult plant the lower surface of the leaf is totally covered with brown dusty capsules.

The second species much resembles the above; but it is silvery, and more regularly divided, having purple fructifications proceeding from the inner edge, which are cleft longitudinally; the last divisions of the fronds being subulate, roundish, and straightish.

The third sort rises to eighteen or twenty inches in height. The cup is round, covered with ferruginous hair, and leafy almost from the root. The pinnae are about an inch from each other, on a small pedicel; each pinna being about an inch long, and half an inch broad at the base, whence they decrease to the end, which is round; and they are covered all over with a rusty woolly hair.

The fourth species has the stipes about seven inches high, of a dark purple colour. The frond is almost bipinnate, lanceolate, closely imbricated beneath, with chaffy orange-coloured scales. The leaflets are opposite, almost pinnate; having the pinnae ovate, obtuse, thick, quite entire; but the lower ones often toothed on each side at the base. The fructifications spread between the leafy scales over the whole under surface. Sometimes the stipes is blood-red, all hairy, from eight inches to a foot in height.

The fifth has much resemblance to the above, but only rises a few inches in height, seldom exceeding seven. In this the stipes is of a green colour.

There are several other species described by Professor T. Martyn, in his edition of Miller's Dictionary, that may be cultivated with equal facility, but they have been yet little introduced among gardeners.

Culture.—All the above species may be cultivated and preserved by being planted out in pots

filled with gravel or lime rubbish. Hence they are proper for the purpose of adorning different kinds of artificial rock-work, and for being planted upon old walls.

But those species which are natives of warm climates require to be planted in pots, and plunged into bark-pits, in order to preserve them in this country.

ACTÆA, a genus comprehending plants of the Herb Christopher or Baneberry kind, which are hardy herbaceous perennials, of tall growth.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a perianthium of four leaves, with roundish, obtuse, concave, and caducous leaflets: the corolla has four petals, acuminate at both ends, longer than the calyx, and caducous: the stamina consist of numerous, usually about thirty, papillary filaments, broader at top: the antheræ are roundish, twin, and erect: the pistillum has a superior ovate germ, no style, and a thickish, obliquely-depressed stigma: the pericarpium is an oval-globose, smooth, one-furrowed, and one-celled berry; and the seeds are many, semi-orbicular, and lying over each other in two rows.

The species that chiefly deserve notice for the purpose of cultivation are: 1. *A. spicata*, Common-spiked, Black-berried Herb Christopher; 2. *A. racemosa*, Clustered, Long-spiked, American Herb Christopher.

The first sort grows two feet and a half high, the footstalks of the leaves rising from the root; these divide into three smaller footstalks, each of which divides again into three, and these have each three lobes, so that each leaf is composed of twenty-seven lobes or small leaves. And the flower-stem which rises from the root has leaves of the same form, but smaller. On the top of the stalk appear the flowers, which grow in racemose spikes, and are of a pure white; these come out in May, and are succeeded by black shining berries about the size of peas, which ripen in autumn.

There is a variety of this plant with white berries, and another in which they are of a red colour.

The second kind has large compound leaves, which rise immediately from the root, and are branched after the same manner with the first. The flower-stems frequently rise to the height of four or five feet or more. The flowers are white, in a long spike, reflex at the top. It flowers in June, or the beginning of July, but does not perfect seed in this climate. It is a native of North America, where it is often distinguished by the title of Black Snake-root.

Culture.—The propagation of these plants may

be easily effected by sowing the seed on a shady border of common earth in the autumn, as soon as they are taken from the plants, as when the sowing is deferred till the spring they are liable to remain in the soil until the same time in the following year before they come up, and much time is lost. From the irregular manner in which the plants mostly appear, the mold of the beds should be as little as possible disturbed, lest they be destroyed. When fully grown in the succeeding autumn, they may be transplanted into the situations where they are to remain, which should be rather shady.

The seeds of the second species are mostly sent annually from America, and should be put into the ground as soon as possible after they arrive.

As these plants rise to a considerable height, and are ornamented with leaves on the lower part of the stems, and with handsome spikes of flowers on the upper parts, they are well suited for adorning the common compartments and clumps of pleasure-grounds, especially where there is a degree of shade without the inconveniences of large trees; and also in the intervals between large shrubs in conspicuous situations, where, from their hardy nature, they will only require the same treatment as them.

As these plants are perennial in root, but annual in the leaf and stem, these last require to be cut off and cleaned away every autumn.

The berries of these plants are believed to have a poisonous property, a single berry being said to be capable of instantly destroying fowls and other birds.

ADANSONIA, a genus furnishing a tree of the deciduous kind, which grows to an extraordinary size in its native soil. It is the *African Calafash Tree*, which, when cultivated here, does not rise to any great height.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferæ*.

Its characters are: that the calyx is a one-leaved, semiquinquefid, cyathiform perianthium, with divisions revolute, and deciduous: the corolla consists of five roundish, nerved, revolute petals, connected by the claws with each other and the stamina: the stamina have numerous filaments united at bottom into a tube, which they crown, expanding horizontally: the pistillum has an ovate germ, very long, tubulous, and variously intorted style: the stigmata are many, often ten, prismatic, villous, and radiate-expanded: the pericarpium is an ovate, woody, not gaping, ten-celled capsule, with farinaceous pulp, and the partitions membranaceous: the seeds are numerous, kidney-shaped, rather bony, being involved in a friable pulpy substance.

There is only one known species, which is the *A. digitata*, Ethiopian Sour Gourd or Monkey's Bread.

In this species the young plants, and also most of the new branches, have single spear-shaped leaves towards their lower part; but at their extremities the leaves have some three, and others five lobes, of the same size and form as the lower, which are disposed like a hand; these are entire, ending in a point, and fall off in the winter season. The stems are large and woody, but of a soft texture, and have generally a large swelling near the root. According to the account given by monsieur Adanson, some of these trees, in Senegal and other parts of Africa, measured from sixty-five to seventy-eight feet in circumference; but their height was not extraordinary. The trunks were from twelve to fifteen feet high, before they divided into different horizontal branches which touched the ground at their extremities; these were from forty-five to fifty-five feet long, and were so large that each branch was equal to a very large tree: and where the water of a neighbouring river had washed away the earth, so as to leave the roots of one of these trees bare and open to sight, they measured one hundred and ten feet long, without including those parts which remained covered by the earth.

It affords a fruit which, when fresh and eaten with sugar, is said to be pleasant to the taste, being of an acid flavour.

Culture.—The method of propagating this tree is by seeds, which must be procured from the country where it grows naturally, for it does not produce any in this climate: these should be sown in pots, and plunged into a hot-bed, where, in about six weeks, the plants will come up, and in a short time afterwards be fit to transplant; when they should be each planted in a separate pot, filled with light sandy earth, and plunged into a fresh hot-bed, taking care to shade them until they have taken new root; after which they should have free air admitted to them every day in warm weather, but must be sparingly watered; for as their stems are soft, especially when young, too much moisture is apt to make them rot. As the plants advance in growth they are to be shifted into larger pots, but must constantly be plunged into the bark-bed, being too tender to thrive in this country without this artificial heat: they must therefore constantly remain in the stove with other tender exotic plants. The plants when young make great progress in their growth where they are properly treated; for in three years many of them have been more than six feet high, and have put out several lateral branches; their stems being in proportion; but after four or five years' growth they are almost

at a stand, their annual shoots rarely exceeding two or three inches.

These trees are only cultivated in this country for the singularity of their appearance, and the variety which they afford in the hot-house or stove.

ADENANTHERA, *Bastard Flower Fucc*, a genus which contains plants of the tree, evergreen, and exotic kinds; and of Indian growth.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceae*.

The characters of which are: that the calyx is a one-leafed, five-toothed, very small perianthium: the corolla is five-petalled, and bell-shaped: the petals are lanceolate, sessile, convex inwards, and concave underneath: the stamens are subulate filaments, erect, and somewhat shorter than the corolla: the anthers are roundish, incumbent, bearing a globose gland at the outer tip: the pistillum is an oblong germen, gibbous downwards; style subulate, and as long as the stamens: the stigma is simple: the pericarpium is a long, compressed, membranaceous legume, and the seeds are very numerous, roundish, and remote.

There is only one species that has yet been introduced into cultivation in this country, which is the *A. paronina*.

It is a tree with prodigious decomposed or doubly pinnated leaves: the leaflets are ovate, obtuse, quite entire, on very short petioles, sometimes alternate, sometimes opposite: the panicle consists of simple, thick racemes, with the floscules on equal pedicels. The flowers are comparatively very small, and of a yellow colour. The legume is nearly a foot in length, repand at the sutures, and obscurely torulose at the seeds, smooth, one-celled, two-valved; the valves after they are open being loosely and spirally twisted. The seeds are few in proportion to the length of the legume, obovate-rounded, convexly lens-shaped, highly polished, of a shining black colour, with a circular streak in the middle on each side. This is a tree which in its native state grows to a very large size, and the timber is in much use on account of its great solidity. It flowers in September, bears fruit at the beginning and end of the year, and is never without leaves. The seeds, besides being eaten by the common people, are of great use, on account of their equality, for weights, each of them weighing four grains: they also make a cement by being beaten up with water and borax.

There is a variety of this plant which has vivid scarlet seeds; but which Miller found to be extremely slow in its growth.

In this country it only rises to the state of a shrub.

Culture.—The method of raising plants of this sort is from the seeds, which are obtained from abroad, and sown in pots of good mold, their vegetation being promoted by the assistance of a hot-bed, under glasses, or the bark-bed. After the plants are a little advanced, they should be placed out in the bark-stove of the hot-house, where they must constantly remain; and where, from their large and beautifully branching leaves, they afford a fine appearance. They have not yet been found to produce flowers in this climate.

ADIANTUM, *Maiden-hair*, a genus comprehending several herbaceous perennial plants of the fern kind, some of which have been introduced into culture.

It belongs to the class and order *Cryptogamia Filices*.

The characters of which are: that the fructifications are collected in oval spots at the end of the fronds or leaves, which are folded back; or at the reflex tip of the frond underneath.

The species are very numerous, but there are only a few introduced into cultivation; the principal of which are: 1. *A. Capillus Veneris*, True Maiden-hair; 2. *A. pedatum*, Canadian Maiden-hair; 3. *A. reniforme*, Kidney-leaved Maiden-hair; 4. *A. fragrans*, Sweet-scented Maiden-hair; 5. *A. pleroides*, Heart-leaved Maiden-hair; 6. *A. villosum*, Hairy-stalked Maiden-hair; 7. *A. trapeziforme*, Rhomb-leaved Maiden-hair.

In the first, the fronds, branches and petioles are of a shining blackish colour. The leaves are at first roundish, afterwards wedge-shaped. The stem is slender, and of a dark purple colour. The petioles of the branches are very large, sustaining three leaves, which are smooth, tender, toothed in the further part, fan-shaped, dilated, either cut shortly into lobes, or more deeply, three-, four-, seven-lobed; the lobes obtuse. There is one or two fruit-bearing dots to each tooth, to which the edge of the leaf is attracted. The roots are of the fibrous creeping kind. It is a native of France, Italy, and other southern kingdoms.

In the second species the root is small. The stipes is of a dark purple colour, eighteen inches in height or more. The leaves have much resemblance to the comb of a cock. It is a native of Canada in America.

The third sort has the fronds somewhat of the kidney form, the stalks being adorned with numerous flowers. It is a native of the Island of Madeira.

The fourth species has the fronds bipinnate; the pinnae being ovate, sublobed, obtuse, and naked underneath. It is an inhabitant of the same island as the above.

In the fifth, the stipes are seven inches high, of a purple colour, smooth. The pinnae are streaked;

the edge being covered underneath with as many white scales as there are notches, covering the fructifications. It is a native of the Cape of Good Hope.

The sixth sort rises to the height of two feet. The stem is of a black colour, strong, triangular, and covered with a hairy, ferruginous, mossy substance. The fronds proceed from this about a foot from the ground. The pinnae are alternate; the pinnules being an inch long, and about half as broad, and of the figure of a trapezium. It is a native of Jamaica.

In the seventh species the leaflets are alternate; the pinnae being of a rhomboid form, gashed, bearing fruit on each side. It is found in its native state in New Zealand.

Culture.—The first and second species of these plants require little or no trouble in their cultivation, being propagated simply by parting their roots. The latter is however the most tender, as though it will often stand through the winter in the open air, when the winter is not too severe, yet when that season is very severe it is liable to be destroyed by the frosts. A plant or two should of course always be kept under the shelter of a frame, or the greenhouse. The first succeeds much better when planted out in pots filled with gravel and lime rubbish than if put in good mold.

The third, fourth, and fifth species require the constant protection of the greenhouse, in order to preserve them in the winter season.

And the last three sorts, from their being naturally inhabitants of hot climates, demand the continual aid of the stove to preserve them.

All the species are useful for the purpose of affording variety, and the three last highly curious and ornamental among collections of exotics, on account of their black shining stems, and the great irregularity in the shape of their leaves.

ADONIS, a genus comprehending several annual and perennial herbaceous plants of the flowery tribe; the *Flus Adonis*, Adonis Flower, or Pheasant's Eye.

The characters are: that the calyx is a five-leaved perianthium, and the leaflets are obtuse, concave, a little coloured and deciduous: the corolla has from five to fifteen, but most commonly eight, oblong, obtuse, shining petals: the stamina consist of very short subulate filaments, and the antheræ are oblong and inflex: the pistillum has numerous germs collected in a head, no styles, and acute reflex stigmas; no pericarpium, but an oblong, spiked receptacle: the seeds are numerous, irregular, angular, gibbous at the base, reflex at the top, a little prominent, and naked.

The species chiefly cultivated are: 1. *A. au-*

autumnalis, Common Autumnal Red Adonis; 2. *A. aestivalis*, Summer Fall Yellow-flowering Adonis; 3. *A. vernalis*, Spring-flowering Yellow Perennial Adonis; 4. *A. Apennina*, Apennine Adonis; 5. *A. Capensis*, Cape Adonis; 6. *A. vesicatoria*, Blister Adonis.

The first of these species has the stalk about a foot high and upright, somewhat angular, hollow, of a purplish colour, hoary, and branched quite to the bottom; the branches being generally taller than the stalk which produces the first flower. The leaves are alternate, of a yellowish green colour; the lower ones petioled, and the upper ones sessile; all superdecompound: the segments numerous, capillary, pointed, and shining on the under side. The leaflets of the cup subovate, unequal, and of a purple colour, shorter than the corolla; the tips being toothed, and appearing as if bitten. The corolla consists of eight petals, seldom more, but often fewer, unequal, obcordate, the tip being irregularly notched, and of a scarlet colour, with the bottom internally black, but externally greenish. The stamina are about forty in number; the filaments filiform and white: the antheræ ovate, obtuse and compressed, of a blackish purple colour; the pollen being saffron-coloured. The head of the germs is short, and somewhat conical. The stigmas pointed, the points being turned back. The seeds are somewhat angular, pointed, reticulate and wrinkled. It is a native of most of the southern parts of Europe. It now also grows in this country, in many parts near London.

In the second, which is by some supposed scarcely distinct from the former, but by others is said to differ from it in having the flower smaller, with the colour a higher red; the branches are more open, and the fruit is of an oval form. The petals are from five to eight. It is a native of the southern countries of Europe, and flowers in May and June.

There is a variety of this which has a pale yellow corolla.

The third species has the stem branched from the bottom, hairy, but finally becoming bald, streaked, scarcely a foot high, equal, or not swelling at the joints. It has several leaves, which burst forth together from the root early in the spring, and cover the young stem; afterwards some of these sit at the bottom of the stem, whilst others are placed at the insertion of the branches, on very wide long sheaths, terminated by a multifid leaf, only one-third of the length of the sheath. Hence, properly speaking, there are no root-leaves. The stem- and branch-leaves are entirely different from the former; for the nearer they approach to the top of the stem the more decompound they become, which is un-

usual. Their sheaths are very short, and half-stem-clasping; all the leaflets scarcely exceeding two lines in length, but which are rigid and pungent. There are no calluses at the insertion of the leaflets. The peduncle terminating, one-flowered, and half an inch in length. The cup, which scarcely emerges from the uppermost leaf, has the leaflets of a yellowish green or a sordid colour, hirsute, concave, or flat, lanceolate-ovate, and half the length of the corolla. The petals are more narrowed or lanceolate than in the following species, so as even to be linear. The seeds are thicker at the tip, hirsute, with a very slender dagger-point below the tip. Its large yellow flowers are produced at the end of March or the beginning of April; and the seeds ripen in August. It is a native of the mountainous parts of Germany.

In the fourth the stem is a foot and a half in height; in the young plant ash-coloured, but in a more advanced growth bald and entirely smooth, marked with lines; the branches being alternate and thicker at the joints. The root-leaves are very large, almost orbicular, four-fold and pinnate: the pinnas opposite, pinnules alternate: leaflets lanceolate-linear, acuminate, smooth and even; all the insertions marked with a white callus: the petiole half a foot long, grooved, sheathing the stem at its base. The lowest stem-leaf, at the base of the lowest branch, resembles the root-leaves, but is smaller: the sheath is wide, embracing the stem; but the petiole is scarcely half an inch in length. The leaves on the stem and branches are hardly petioled: they half embrace the stem, have scarcely any sheaths, and the pinnules are so near to each other that the leaves in general seem to be digitate-multifid. The sheaths do not lose their pubescence. The flower terminating, one on each branch: the petals obovate or lanceolate-ovate: the cups hairy, subglobose, coloured, concave, with lines or streaks of a different colour. The peduncles are grooved, but the stem is not. The seeds are ovate, surrounded with a rim, having a dagger-point curved back, and smooth.

The fifth species has the leaves radical; the leaflets rigid; and the petioles rough with hairs. The scapes leafless, round, hairy, and terminated by a compound umbel. The universal and partial involucre are six-leaved and lanceolate. Partial peduncles, three outer, three inner, and one central, bearing one flower; the rest four-flowered. The cup is ovate-oblong, concave, whitish; petals lanceolate, white, twice the length of the cup; the filaments linear, half the length of the petals: the antheræ two, ovate and small: the styles bent outward, the length of

the stamina: the stigmas obtuse, and the foliation involuted. It is found wild near the Cape of Good Hope.

The sixth is perfectly smooth, with hard firm leaves. It is also a Cape plant. The Africans use it for raising blisters.

Culture.—The first two sorts may be readily propagated by the seeds, which should be sown in a light soil, in the borders or clumps where they are to remain and flower (for they do not bear transplanting well) in the autumn, about September or the beginning of October, as in that way the plants will appear in the following spring; but where the sowing is deferred to the spring, the plants seldom come to the state of flowering the same year. The seed should be covered to the depth of nearly half an inch; and when the plants are risen to the height of two or three inches they should be thinned out, till only two or three of the largest remain in each patch, as by that means they have a better effect when in flower. Some seed should likewise be sown in both warm and shaded situations, in order that the period of their flowering may be protracted to a greater length. Where the method of transplanting is practised, the plants should be removed as soon as possible after they appear, and have a very slight watering given them for a few days when the season is dry.

The only culture that will afterwards be required, in either of the methods, is that of occasionally weeding, so as to keep the plants perfectly clean, and watering them when necessary.

These two are annual plants both in root and stem, coming up, attaining their full growth, perfecting their seed, and wholly decaying in the same year; they must of course be sown annually.—See ANNUAL PLANTS.

In the third and fourth species the propagation is also effected without difficulty, both by sowing the seeds and parting the roots. When the first method is practised, it should be done as soon as possible after the seed has been ripened, in August or the beginning of September, in the same kind of soil and situation as the former, as they do not succeed well when put in much later: after the plants are come up they must be kept perfectly clean and free from weeds; and when the season is very dry occasionally watered, in order to promote their growth. The plants, after being thinned out, in the manner directed above, where they stand too thick, as they advance very slowly in their early growth, should be suffered to stand where they are sown until the second year. In afterwards transplanting them out where they are to remain, the most proper time is the autumn. They should not after this be disturbed, as when that

is the case the plants neither flower so well or with such vigour as under other circumstances.

In parting the roots, the business may be performed either in the autumn or the spring; but the former is to be preferred in general, as by that means the new plants are more fully established before the hot season sets in. These plants, being only perennial in root, require the stems to be cut off and cleared away in the autumnal months.

The last species, being more tender, requires the aid of the stove or greenhouse to protect it in the winter season in this climate. It may also be raised from seed, by sowing it in pots of good earth in the autumn or spring months, and placing it in the hot-bed or stove; being afterwards managed in the way of other tender exotic plants.

As the flowers of the first four species are mostly large and ornamental, and in some of them come out early in the season; they may be employed with good effect, in combination with other herbaceous plants, in adorning the anterior parts of the borders, clumps, and other compartments of shrubberies and other pleasure grounds.

The two Cape species are employed in affording an agreeable variety in the stove and the greenhouse.

ADOXA, a genus comprehending the *Tuberous Moschatel* or *Hollow Root*, which is a hardy herbaceous perennial of low growth.

It belongs to the class and order *Octandria Tetragynia*, and ranks in the natural order of *Succulentæ*.

The characters of which are: that the calyx is an inferior, bifid, or trifid, flat and permanent perianthium: the corolla is monopetalous, flat, and divided into four or five segments, with ovate, acute clefts, longer than the calyx: the stamina are subulate filaments, of the length of the calyx, and the antheræ roundish: the pistillum has a germ below the receptacle of the corolla: the stiles are simple, erect, of the length of the stamina, permanent, and equal in number to the clefts of the corolla: the stigmas are simple: the pericarpium is a globose berry, between the calyx and corolla, the former being united below with the berry, umbilicate, and four- or five-celled: the seeds are solitary and compressed.

There is only one species, which is the *A. Moschatellina*, Moschatel, or Musk-smelling Adoxa.

It has the root perennial, creeping, toothed, and of a white colour: the root-leaves three or four, triternate, deeply cut, smooth and shining: the segments or lobes are ovate, with a short point: there are two leaves on the stalk with shorter petioles, and opposite: the stalk is some-

what taller than the leaves, simple and nearly square: the peduncle is square, naked and terminal: the head cubical, consisting of four lateral flowers, and terminated by a fifth: in the former, ten, in the latter, eight stamina; and in the former five, in the latter, four styles: the flowers varying much both in the divisions of the calyx and corolla, and in the number of the stamina. It flowers towards the end of March or the beginning of April, and the berries ripen in May; soon after which the leaves decay. These as well as the flowers have a musky smell.

Culture.—The propagation of this plant is best accomplished by offsets from the roots, which should be transplanted into the situations where they are to remain, in the summer or autumn, as soon as convenient after the leaves and branches have decayed. This plant succeeds best in shady situations, as under the foliage of shrubs, for when exposed to the full sun it seldom grows well. It is a low-growing plant, and does not possess much beauty; but from the above property it may be useful in adorning and affording a variety in wilderness quarters, and other places where it is difficult to get plants to grow on account of the shade.

ÆSCHYNOMENE, the *Bastard Sensitive Plant*, a genus including plants of both the annual and perennial exotic kinds, and of somewhat shrubby growth.

It belongs to the class and order of *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters of which are: that the calyx is a one-leaved, bell-shaped, sub-bilabiate perianthium, with equal lips, the upper bilid, and the lower three-toothed: the corolla papilionaceous, with a sub-cordate, scarcely gaping, large banner; sub-ovate, obtuse wings, shorter than the banner; and lunate, acuminate keel of the length of the wings: the stamina have ten filaments, single, and nine-cleft, and small antheræ: the pistillum is an oblong, villous, columnar germen: the style subulate and rising: the stigma simple, rather obtuse: the pericarpium is a long, flat-jointed, rough, one-celled legume, opening at the truncate joints: the seeds are solitary, between the joints, and kidney-shaped.

There are several species: but those mostly cultivated are, 1. *Æ. grandiflora*, Great-flowered *Æschynomene*; 2. *Æ. arborea*, Tree *Æschynomene*; 3. *Æ. coccinea*, Scarlet-flowered *Æschynomene*; 4. *Æ. Sesban*, Egyptian *Æschynomene*; 5. *Æ. aspera*, Rough-leaved *Æschynomene*; 6. *Æ. Americana*, American Hairy *Æschynomene*.

The first is a shrub rising from ten to fifteen feet in height. The trunk is upright, without

spines: the branches spreading a little, round and pubescent. The leaves are pinnate, alternate, scattered, a foot long: petioles round, thicker at the base and smooth. The leaflets from twelve to eighteen pairs, opposite, oblong, obtuse, entire, smooth on both sides, standing on very short petiolules. The peduncles are axillary, few, short, bifid or trifid: the pedicels short, and one-flowered. The flowers are pendulous, of a white colour, very large, frequently the size of a hen's egg. The cup is obtusely five-toothed, ovate-globose, swelling a little. The corolla resupinate: the banner wide, reflex, sub-cordate at the base, elliptic entire, waving on the edge: the wings oblong, sickle-shaped, with claws at the base, sharp, pressed close to the keel, which is a little shorter than the banner, undivided, sickle-shaped, angular in the middle, curved, and the outmost tip bifid. The legume is two feet in length, linear, compressed, with a membranaceous isthmus between the seeds, which are of a roundish form. It is a native of the East-Indies.

The second species grows to the height of six or seven feet, with a single stem: the leaves are smooth, and come out towards the top of the stalk, forming there a sort of head; they are composed of many pinnae, placed alternately on the mid-rib. The flowers proceed from the wings of the leaves, two or three together, are large, and of a copper colour.

The third is a smaller and lower tree than the first; but the head and leaves are more close: the latter are about a foot in length, and have twenty pairs of leaflets. From the axils proceeds a single peduncle, dividing into two, each of which bears a large flower, but somewhat smaller than that of the first sort, and the colour is red mixed with purple. The legume is a foot and half in length. It is a native of the East Indies, and of several of the islands in the South Seas.

The fourth has woody stems and branches, with smooth leaves composed of many blunt opposite pinnae. The flowers, which are small, and of a deep yellow colour, come out from the axils in long spikes hanging downwards. The legumes are smooth and taper-pointed, not jointed: the cups are bell-shaped, equal, five-toothed and spreading. It flowers in July and August, and is a native of Egypt.

The fifth rises to the height of four or five feet, with a single herbaceous stem, which is in some parts rough. The leaves come out on every side towards the top, forming a sort of head, and they are composed of a great number of smooth glaucous pinnae. The flowers proceed from between the leaves, two or three together, upon long petioles, and are of a yellow colour. The legume is about four inches in length. It is a native of the East Indies.

And the sixth has an annual root. The stem is from one to two feet in height; sometimes, but rarely, reaching three feet; it seldom stands upright, but is subdivided, round, and somewhat hirsute, delicate and slender. The branches are filiform, patulous, round, streaked, hirsute. The hairs ferruginous at the base. The leaves pinnate, alternate: leaflets sessile, alternate, minute, sickle-shaped, serrulate, three-nerved beneath, smooth on both sides. The petioles thicker at the base, round, hirsute. The stipules sickle-shaped above and below the petiole, opposite, acuminate, somewhat hirsute. The peduncles longer than the leaves, axillary, solitary, and erect. The flowers are pedicelled, alternate, whitish, or brownish yellow. The bractæ sessile, ovate-acuminate, serrate, streaked and hirsute at the edge. The cup has the upper lip serrate at the tip or bluntly three-toothed, and pubescent at the edge. The corolla, banner-streaked; wings obovate; keel ovate, sickle-shaped, upright and bifid. The legume almost upright, pendulous, margined, wrinkled and pubescent, linear-oblong, compressed, straight at the suture next the seeds, lobed and crenate on the other suture: joints six or seven, semi-orbicular, gibbous in the middle, compressed at the edge, separating spontaneously. The seeds are crescent-kidney-shaped, turgidly lenticular, smooth, shining and black.

This species is said to be somewhat sensitive; and during the night, or at the approach of rain, the leaves fold together in some degree. It is a native of the West Indies.

Culture.—The propagation of these plants may be accomplished by sowing the ripe seed on a moderate hot-bed, about the latter end of March or beginning of April; and when the plants have advanced to the height of two or three inches, and are become sufficiently strong, they must be transplanted out separately into small pots filled with light earth, and be immediately plunged into a new hot-bed, in order to promote their growth more effectually. Afterwards, as they advance in size, they should be carefully removed into larger pots: much attention is, however, necessary not to overpot them, as where this is the case the plants seldom thrive well.

The first species being tender requires considerable attention, in order to preserve it during the winter in this climate, by raising and keeping it in the hot-bed and stove bark-bed in the manner directed above; in which treatment it may be preserved in the winter, and afford flowers in the ensuing summer months.

The second, third and fourth sorts also demand a similar protection in the stove bark-bed

in the winter season; by which means they are made to flower more early in the succeeding summer, and the seeds become ripe in the autumn. And as their stems are of a succulent nature, they should be kept rather dry during the cold moist winter months, in order to prevent their roots from rotting. In this intention it is advised to put them into the bark-bed instead of the dry stove, as in the latter case, from the root-fibres becoming dry, the plants soon droop for want of moisture; and if it be supplied in that situation, the plants are quickly destroyed by the decaying of their roots.

The fifth and sixth species, from their being annual plants, require to be brought forward early in the year, in the same manner as the first kind, as where that is not the case they seldom perfect their seed.

These plants afford an agreeable and pleasing variety in stove and greenhouse collections.

ÆSCULUS, the *Horse Chesnut Tree*, a genus comprising several hardy trees of the deciduous kind, employed for the purpose of ornament.

It belongs to the class and order of *Heptandria Monogynia*, and ranks in the natural order of *Trihilatae*.

Its characters are: that the calyx is a one-leaved, ventricose, small and five-toothed perianthium: the corolla consists of five roundish petals, plaited and waving about the edge, flat, spreading, with narrow claws inserted into the calyx, and irregularly coloured: the stamina have subulate, declining filaments, of the length of the corolla, and ascending antheræ: the pistillum is a roundish germ, ending in a subulate style; the stigma acuminate: the pericarpium is a leathery, roundish, three-celled, three-valved capsule: the seeds are two, and subglobular.

The species are: 1. *Æ. Hippocastanum*, Common Horse Chesnut: 2. *Æ. flava*, Yellow-flowered Horse Chesnut: 3. *Æ. pavía*, Scarlet Horse Chesnut.

The first, or Common Horse Chesnut Tree, is sufficiently known by the beautiful parabolic form in which the branches are disposed, when it stands single; by its digitate leaves, which are composed of seven leaflets, serrate about the edge, the middle one largest, the outer ones smallest; and by its handsome, upright, pyramidal thyrses of white flowers, variegated with yellow or red towards the centre. Some of them towards the top of the thyrses being imperfect and abortive, they come out soon in the spring. The capsule, or nut as it is often termed, is divided internally into three cells according to some, but into two only, as others assert.

In this climate it rises to the height of fifty or sixty feet or more; and its leaves, which are large

and of a beautiful dark green colour, appear very early in the spring, the leaf-buds often beginning to swell out in January. It also forms its shoots in a very rapid manner, being often completed in the course of three weeks from the period of foliation; and which Miller asserts he has found a foot and a half in length with their leaves completely expanded. It is a native of Asia, and comes to this country from the Levant.

There are varieties of this tree cultivated, which have gold-striped and silver-striped leaves.

In the second species the leaves are digitate, having five leaflets; the laminae of the corolla being heart-shaped and roundish; the claws having twice the length of the calyx. This rises to nearly the same height as the former; but its flowers are of a yellow colour and appear later, as in May or June. It is a native of North Carolina in America.

The third, or Scarlet Horse Chesnut, rises to the height of about fifteen or twenty feet, but does not spread its branches to so great an extent as the former. The bark is smooth. The leaves are of a light green colour, standing opposite, and on long red petioles. The flowers are produced from the ends of the branches, upon long naked peduncles, each sustaining four or five flowers: these are much smaller than in the common sort, wholly red, tubulous without any brims, opening a little at the top, where the stamina appear, being seven or eight in number, terminated by roundish antheræ. They appear in June, and are sometimes succeeded by fruit in this climate: but the seeds rarely ripen. It grows naturally in Brazil, Japan, and several parts of the East.

Culture.—In the propagation and culture of these trees there is but little difficulty where the soil is suitable.

The first sort, or Common Horse Chesnut, will grow in different kinds of soil; but it succeeds with the greatest certainty, and in the most complete manner, in the deep loamy kinds, where the bottom is dry. It does not thrive well where the soils are in any great degree retentive of moisture, as in those of the marshy description. And in bleak exposed situations, and where the soil is thin and light, it is raised with much difficulty and trouble.

When it is cultivated on such soils as are in a slight degree inclined to moisture, the foliage, however, preserves its verdure much longer than when it is grown on lands that are very dry and porous.

It is mostly raised from the seed or nut, which should either be bedded in, or planted in drills to the depth of two or three inches, and half a foot or more distant in the rows, on spots of

good earth; the most proper season for performing which is as early as possible in the beginning of the year, as the latter end of January or beginning of February. The nuts should be preserved in sand during the winter, in order to prevent their contracting any mouldiness, and being thereby injured. When planted in autumn they are not only in danger of being destroyed by rotting, but from the attacks of vermin.

The young plants mostly appear in the latter end of April or beginning of May, and advance so quickly in their growth during the summer, as to be ready for transplanting in the autumn or following spring, about February or March. This should be performed in rows at the distance of three feet from each other, the plants being set at the distance of one foot from each other in the rows. In thus removing them, the roots should not be too closely cut over. They may then continue in the same situation for the space of two years, when they will be in a proper condition for being finally planted out; as when they are set out while young they mostly grow to a larger size. In this removal the plants should be taken up with great care, and the roots be touched as little as possible by the knife, except such parts as are bruised, as the trees seldom succeed well where the roots are much cut. If they are intended for large plantations they may, however, remain in their situations till they have attained a larger size. In either case the holes in which they are planted should be large, the top part of the roots being left nearly on a level with the surface of the ground, the fibres of which should be spread out and lapped in the fine mold that is well wrought to the bottoms. They should afterwards be staked and fenced in from cattle. October in dry soils, and February and March in moist ones, are the best seasons for this business.

The varieties of this tree with striped leaves are to be propagated either by layering, budding, or ingrafting them upon stocks of the common kind. For the first of these methods the autumn is the most proper season, but the latter may be best executed during the spring months.

The second and third kinds are likewise capable of being propagated by means of the nuts, which, as they seldom attain a perfect degree of maturity or ripeness in this climate, should be procured from the places where the trees grow naturally. They are then to be planted in pots of good earth in the early spring months, and immediately afterwards plunged in a hot-bed of a moderate temperature, air being freely admitted, by which their germination and early growth will be greatly forwarded. About the latter end



Painted by Syd. Edwards

London Published June 1876, by G. Kearsley Fleet Street

Engraved by F. Simpson

1 *Agapanthus umbellatus*
African *Agapanthus*

2 *Asphodelus luteus*
Yellow *Asphodel*

of May, or the beginning of June, the pots should be removed from this situation and placed up to their tops in the open ground, on a bed or border which has a southern aspect, water being occasionally given them in dry weather, in order to promote their growth as much as possible before the autumn. And as at this last season the plants, from their not being capable of resisting cold while young, are liable to be greatly injured or destroyed by the effects of the early frosts on their top buds, they should be carefully sheltered by some sort of thin covering. In the early part of the following spring they should be carefully taken up, separated, and planted out in a warm situation, at the distance of a foot from each other in every direction, and during the severity of the ensuing winter be carefully protected in the same manner as before. After this they generally become so hardy as not to require any further protection in the winter months. Where the practice of merely setting the nuts in borders of good light earth in unexposed situations, and removing them to spots of ground of the same nature in the following spring, to remain till they have acquired sufficient strength to be finally planted, is adopted, many of the plants are liable to be destroyed.

As the nuts or seed of these trees are frequently obtained with difficulty, the plants are often propagated, especially in nursery grounds, by budding or grafting them upon stocks of the Common Horse Chesnut; but in this way, as the stocks greatly outgrow the buds or grafts, the trees are neither so durable in their growth nor have so handsome an appearance.

It is observed in the new edition of Miller's Dictionary, by Professor Martyn, that the shoots in the first species, as has been already mentioned, are not only made with great rapidity, but that immediately on the falling of their flowers the buds at the extremities of the new shoots are formed for the ensuing year, and continue to swell out and enlarge till the autumn; at which season the covers that infold them are coated over by a thick tenacious juice, that serves to defend them from the prejudicial effects of frost and rain in the winter; and which, as the weather becomes warm in the spring months, dissolves and runs off, leaving them at full liberty to expand themselves, without ever hardening so as to impede the process.

This affords a sufficient reason for never touching the young shoots or branches of the trees by the pruning-knife, as where that is the case the means of the future shoots are wholly prevented, and the beauty of the trees destroyed.

All the different species of the Horse Chesnut are, from the great regularity of their form, and

the beauty of their leaves and flowers, well suited for the purposes of ornamental planting in extensive parks, lawns, and other pleasure grounds. When placed singly in open spacious grounds, considerably detached, or in clumps of two, three, or more, interspersed with other trees of similar growth, they produce a fine effect, and afford considerable variety. And in very extensive plantations, a tree or two of this sort may be occasionally introduced towards the fronts with great propriety and effect. In avenues or walks of considerable length, it may likewise be thinly employed in assemblage with the Lime, Maple, Spanish Chesnut, and other trees that afford much shade from the thickness of their foliage: but when planted regularly in rows, without being blended with trees of other kinds, as was formerly the practice, from standing too close it seldom retains its leaves or flowers well, and of course much of its ornamental effect is lost.— This circumstance also renders it improper for the purpose of forming a close shade where more than one tree is requisite; but where it stands alone it is capable of producing much shade.

For the purposes of timber it is not a tree of much value, though it may be made use of in various ways by the turner, as well as for being bored for water pipes, as its wood is durable when laid in the ground. But as it is a quick grower, it may be occasionally introduced in plantations of the timber kind.

As an ornamental tree, it has been much objected to on account of its leaves falling at an early period in the autumn, and producing much litter. It may also be an objection to it, in exposed situations and late climates, that from its producing its buds and flowers very early in the spring, it may frequently be liable to be so much checked by the frosts as to be in some measure prevented from flowering.

The Yellow- and Scarlet-flowered species are so highly ornamental as to deserve introduction in almost every kind of pleasure ground, in the borders, clumps, and other compartments of which they should always be placed towards the fronts, in such an arrangement with the other trees and shrubs as that the full effect of their yellow and scarlet flowers may be produced, and at the same time the greatest possible variety be afforded.

AFRICAN MARYGOLD. See **TARGETES**.

AGAPANTHUS, a genus comprehending the *African Lily*.

It belongs to the class and order of *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters of which are: that the calyx is a spathe common, gaping at the side: the co-

corolla is one-petalled, funnel-shaped, and regular; the tube coriaceous, as if composed of six claws; the border six-parted, with the parts oblong and spreading: the stamina are six filaments inserted into the throat, shorter than the corolla, declinate: the anthers are kidney-shaped and incumbent: the pistilium is a superior germ, oblong, three-cornered; the style filiform, of the length of the stamina, and declinate; the stigma simple or trifid: the pericarpium is an oblong capsule, three-sided, three-celled, three-valved: valves navicular, with contrary dissepiment: the seeds numerous, oblong, compressed, and enlarged with a membrane.

There is only one species, the *A. umbellatus*, African Blue, or Asphodel Lily.

It has the root composed of many thick fleshy fibres, diverging from the same head, striking deep into the ground, and putting out many smaller fibres, which are of a white colour and fleshy. From the same head arises a cluster of leaves surrounding each other at the base, so as to form a kind of herbaceous stalk about three inches in height, from which the leaves spread only two ways, appearing flat in the other two. The leaves are thick, succulent, about a foot long, and near an inch broad, compressed, and of a dark green colour. Between these comes out the flower-stalk, which is from two to three feet in height, round, and as large as a man's little finger, naked to the top, where it supports a large head or umbel of blue flowers, inclosed in a sheath, which splits into two parts, and is bent backward. Each flower stands on a pedicel about an inch long. The petals are blunt, and waved on their edges; the umbel being large, the flowers numerous, and of a bright blue colour, making a fine appearance.

They appear about the end of August, or the beginning of September, and frequently continue in full beauty till the spring.

It is a native of the Cape of Good Hope.

Culture.—This plant may be easily propagated by means of offsets taken from the parent plant. The operation of parting them is to be performed at the season when the process of vegetation is in the most languid state, which in this plant is generally about the latter end of June. In performing the work the old plants are to be turned out of their pots, and the mold cautiously cleared away from them, that the fibres of the offsets may be better ascertained. The offsets are then to be separated in such a manner as that their heads may not be injured. When they adhere very closely a knife may be employed for the purpose, being careful not to wound the bulb of either the old or new plant. After this has been accomplished the bulbs are to be planted

out separately, in pots of good garden mold, and placed in shady situations that admit the morning sun. A little water should be given once or twice a week when the season is dry, care being taken not to endanger the rotting of the roots by applying it in too large a proportion. In four or five weeks, when the new planted bulbs have put out fresh roots, they should be removed into other situations that are more fully exposed to the influence of the sun, a little more water being cautiously applied in order to strengthen their flowering. The flower-stems mostly appear in the beginning of September, and towards the end of it the flowers begin to open. At this period, if the season be not quite favourable, the plants must be brought under shelter, in order to protect them from the effects of frost or too much wet, care being taken to admit the air as freely as possible, as without this the flowers become pale, weak, and of a bad colour. About the end of October it is necessary to remove them to the greenhouse, and place them in such situations as that they may have the advantage of free air without being shaded by other plants. During the winter season, when the weather is mild, a little water may be given occasionally; but in case of frost it must be wholly omitted, the plants being kept as dry as possible.

The only management that plants of this sort demand is that of protection from the effects of frost and too much moisture; it is of course only necessary to shelter them in the house in the winter months, without the aid of artificial heat, and place them out in the open air in summer.

AGARICUS, a genus comprising the *Agaric* or *Common Mushroom*, and several other species of a poisonous quality.

It belongs to the class and order of *Cryptogamia Fungi*.

The characters of which are: that the *pileus*, or cap, has gills underneath; that the gills differ in substance from the rest of the plant, being composed of two laminæ; and that the seeds are in the gills.

The species are very numerous, but there is only one that is proper for cultivation in the garden. This is the *A. campestris*, Common Red-gilled Mushroom, or Champignon.

It has the gills loose, in contact but not united with the stem, very thick set, some forked next the stem, some next the edge of the cap, some at both ends, and generally in that case excluding the intermediate smaller gills. The colour pink, changing to that of liver. The cap is white, changing to brown when old, and becoming scurly, fleshy, regularly convex, but flat with age, and liquefying in decay. The flesh

is white; the diameter commonly from two to four, but sometimes nine inches. The stem is solid, from two to three inches high, and half an inch in diameter.

Culture.—There are two different methods employed in raising and propagating the Mushroom: the first or most usual one is that by means of the *spawn* or white fibrous radicles that afford the knobby material from which the mushroom is formed. The second is that by seed; in which the gills of the mushroom are cut out and deposited in the beds, or infused in water, and the beds afterwards well sprinkled over with it. This is, however, a less certain and convenient method than the preceding, and of course less frequently employed.

The situations in which this sort of culture is carried on are very different according to circumstances. It is sometimes attempted in the most dry, warm, and least elevated and exposed parts of the melon or cucumber grounds, or such quarters of the kitchen garden as are the most dry and warm; in which cases the beds should be formed on the surface of the ground, without any trench being dug, as in this way they are capable of being spawned more completely to the bottom, as well as that part more effectually preserved from the injurious effects of stagnant water in the winter season. Coverings of straw, thatch, or other litter, are applied for the purpose of protection. This method is, however, objected to by some as inconvenient, not only on account of the great difficulty and trouble of fully sheltering the beds during the severe winter months, but from the great destruction of the young plants that unavoidably occurs in covering and uncovering the beds in gathering the crops. It is therefore suggested by Mr. Nicol in his *Scotch Forcing Gardener*, that a frame constructed of half-inch feather-edged boards should be made in the form of the roof of a house to any suitable length, having the width of about six feet at the bottom. It should also have slides fixed in different parts, for the purpose of admitting air occasionally; and be very well painted or laid over with pitch, in order to guard against the effects of wet. It is to cover and protect the beds, being lifted off and on at pleasure by two persons; and in severe winters may be covered over with some material, as straw, litter, &c. so as to prevent the mushrooms or the spawn from being destroyed.

It is, however, a better method, where the mushroom is much wanted at different seasons of the year, to have compartments constructed for the purpose; or the back sheds of hot-houses, green-houses, cellars, and other similar places, may answer the intention perfectly well, little light or air being necessary.

At fig. 1. in the annexed plate is seen the representation of a mushroom-house of the first kind, wrought by one fire, but divided in such a manner as to produce the crops in succession. It should have a dry situation, and may be covered either by slate, tiles, or thatch. It is recommended by the author of the *Scotch Forcing Gardener*, who has found it well adapted to the purpose.

Mushrooms may, however, be raised under cover of a long range of glass-framing, erected either in the manner of a hot-house, or the top sloped both ways like the roof of a house, the slopes being of glass work; in which the bed is made, spawned, and covered with straw, litter, &c. as in the common method. This, from its being fully protected from the outward air, and all injuries from rain, snow, frost, and cutting weather of every kind, as well as always dry and warm, mostly proves successful.—Sometimes they are also cultivated in a similar glass frame, in which there is a pit like that of the hot-house, in which the bed is made in the manner of a common hot-bed, raised at top a little above the pit in a rounding form, on which the spawn is placed, earthed over, and then covered thickly with straw.

Nature, generation, and growth of the mushroom.—The mushroom in some measure partakes of both a vegetable and animal nature. In respect to the manner in which it is generated there are different opinions; but the more modern writers in general suppose it to proceed from seed, which is believed to be secreted in or between the gills, and that when the plants arrive to full growth, the head expanding almost flat becomes a large flap, which falls to the ground; and in that way disseminates the invisible seed to adjacent and distant soils and situations; where vegetating in its peculiar manner, it produces the white fibrous progeny called spawn, which is formed within the surface of the earth, or in dung, running and spreading in numerous thread-like strings, or radicle-fibres of a white colour, which produce a number of minute granulate knobs, or tubercles, of the same colour, which are the embryo plants, and which gradually increase into small round heads, enlarging quickly to the size of perfect mushrooms, effecting their growth more or less within the ground, and partly above it. Some accomplish a considerable growth within the earth, suddenly appear through the surface, and arrive to different-sized heads, frequently discovering themselves in a morning in places where there was no appearance of any in the preceding evening.

It is probably from the circumstance of the invisible seed, in the form of fine dust, being thus discharged on the ground and disseminated

by the air to various situations adapted to its nature, germinating and shooting forth for the production of new plants, that abundance of spawn and perfect mushrooms are frequently found in obscure places, where none were ever observed before: as in decayed dung hot-beds, horse-dung hills, dungy composts, and in bye dry places where horse stable dung has lain moderately dry for a considerable length of time undisturbed, and in a decayed condition; as well as in dry meadows and pasture lands.

In whatever manner the spawn is produced, it generates and increases rapidly, affording a plentiful propagation of mushrooms, by extending and spreading its stringy fibres in the earth or dung, according as it is obtained naturally or raised by culture, but especially in the latter method; as, when the pieces of spawnny dung, &c. are planted into garden mushroom-beds, it runs and overspreads the whole just within the surface, as well as penetrates into the beds, and thus often yields a production of mushrooms in regular succession for several months; and after the produce declines, furnishes occasionally good fresh spawn in the interior parts of the dung-beds for future use. Maiden spawn, or that which was never worked in beds, or produced mushrooms, is in general to be preferred, as being more certain of producing abundant crops, and such as are more full and fleshy in their heads.

But although mushrooms grow spontaneously in meadows and grass pasture lands, they can be obtained only occasionally, and at particular seasons, as about the latter end of summer and in autumn, and not always of the wholesome eatable kind: but by garden culture they may be procured at any time of the year whenever they may be required, and always of a good kind both in substance and richness of flavour; and besides constantly procuring the proper dung spawn for planting, there is a greater certainty of their being of the genuine sort.

Culture by spawn, &c.—The common method of propagating and raising mushrooms in garden culture, is by planting, in the manner directed below, the lumps or pieces of spawnny dung or earth in a sort of hot-bed made with horse-stable dung, formed on the ground in a long narrow ridge, both sides sloping like the roof or ridge of a house, to shoot off the wet, or rain and snow, &c. In this mode, when the great heat of the bed is abated to a very moderate degree, the spawn is inserted into both the sloping sides and the ends, as explained below, and the bed then earthed over about two inches thick; the whole being afterwards covered over with dry straw, or clean dry straw litter, laid a foot thick, to remain constantly night and day, in order to defend the bed effectually from the external air,

moisture and cold; as the spawn, being of a particular delicate nature, is equally impatient of extreme hot-bed heat, cold air, and of any considerable moisture, all of which are therefore to be carefully guarded against. By the mild heat of the bed obtained as above, the spawn is set in motion, running and spreading itself in the earth and dung, so as in five or six weeks to produce mushrooms.

It is however a better and more certain method to have the beds for this purpose prepared in houses, sheds, or other protected situations, as explained above.

The true and proper spawn is discovered most commonly in the soils of decayed dung and dungy composts, in the manner explained above; and when genuine imparts a full smell of the mushroom.

Of this sort of spawn it is proper to procure a supply previous to making the bed, in order more readily to judge of the extent of bed that may be necessary; especially as in some places good spawn is difficult to be obtained in any considerable quantity. It should be carefully collected, taking the lumps of spawnny dung entire, and then depositing them in some dry place till they are wanted. The quantity which is proper may in general be at the rate of two or three bushels for a bed of twenty feet in length, and in the same proportion for those of larger sizes.

Mushroom spawn is found in various situations and soils, but more particularly in such as have been mentioned above. In collecting this substance, old dung-hills of horse-dung, &c. dungy compost heaps, stable-yards, where lays of horse-dung have been for some time in a state of decay, especially the dry corners or sides next walls, &c. as also horse-rides under cover, in public livery-stable-yards, that are thickly littered with short stable-dung, should be searched, as they often contain excellent virgin spawn.

In removing decayed dung hot-beds, old mushroom beds, &c. great plenty of excellent spawn may often also be procured; and sometimes in kitchen gardens, where the ground has been thickly dunged in the spring with dryish half-rotted dung, on digging the same ground again in autumn, &c. and looking with care, good lumps of spawn may be seen in the remaining unexhausted dung, and in the clods of mellow dungy earth.

In procuring spawn from grass pastures, it may be found in the earth where mushrooms have been observed to rise, by digging it up in lumps, and may be used where a sufficiency of dung spawn cannot be obtained: but where enough of the latter can be procured, it is to

be preferred to that of the field, for garden culture.

It has been remarked, that where mushroom spawn is obtained from places where the dung happens to consist principally of that from stone-horse stables, it is of a stronger quality than that of the common horse-dung; and, in its culture, more productive in large thick fleshy heads, and continues longer in production in the same bed.

The cultivators of mushrooms near large towns, where vast quantities are raised for sale, generally prefer what they call virgin or maiden spawn, to such as has never been worked or produced mushrooms, and that has not been generated from old beds, as possessing greater vigour in its cultivated growth, and affording a more certain and superior production.

It is sometimes produced by art in composts formed of a quantity of horse-stable dung, of very moderate heat. The shortest moist parts, and as much of the dunging of the horses as possible, should be used, the whole being mixed with some rich mellow earth, or if of a loamy kind, the better; and deposited under the protection of some covered shed, or other place, the mass being closely covered with dry litter: the spawn in this way is sometimes formed in the compost in the course of six or eight weeks.

Spawn is likewise produced by procuring a quantity of full-grown mushrooms, cutting them to pieces, or only detaching the gills, and depositing them into composts as above, or at once strewing them over the surface of the regular beds, earthing them over, and covering them with straw litter.

The best season for finding natural spawn in plenty and perfection, is the autumn and early part of winter, while in full vigour, after the preceding summer's production; though good spawn is occasionally met with at all times of the year, and may be collected accordingly: it is most advisable, however, to procure the general necessary supply in the above seasons; for, spawn being of a singular nature, and liable to perish or be greatly injured by much wet and cold, it should be carefully collected in proper time, before it is weakened by the inclemency of the weather; as it is of much importance to have it in full vigour. If it be in a tolerably dry state, it may be immediately used for spawning such beds as are ready for its reception: but if rather moist, it should remain under cover a few days, to dry a little.

In collecting it, care should be taken to have the lumps or cakes of the spawnly dung, &c. in which it appears, taken up entire, laying them in a basket or wheel-barrow, and carrying them into some dry close shed, or other apartment, to be

deposited securely from wet, cold, &c. previously examining whether any of the lumps be wet; in which case, spread them to dry a little: and if not immediately wanted, let the whole be placed closely together in a warm dry corner, or put in hampers or sacks; and be closely covered with straw, or dry long litter, or garden mats, till wanted for spawning the beds. In this way its vegetative power may be long retained; and, if necessary, may be safely sent to any distance, as is often the case in places where a sufficiency cannot be procured at the time when wanted.

Where great quantities of mushrooms are raised, and consequently considerable supplies of spawn required, there are mostly mushroom-men who, at the proper season, go about collecting, both in town and country, the true sort, which they dispose of by the bushel, at from half a crown to five or six shillings, according to its goodness, and the ease with which it is obtained.

There is a variety of the mushroom termed White Cup, which rises with a small, thin, white head, without any material fleshy part, the spawn of which is entirely useless. It is distinguished by its very fine silky or cobweb-like nature, and exquisitely white hoary appearance, closely spreading in the spawnly lumps, and emitting scarcely any smell of the mushroom.

Constructing the beds.—In the production of this crop much depends upon the proper construction of the beds. The best season for making the principal ones, for the winter and spring production, is the autumn and beginning of winter. The autumn beds may be prepared about the middle or latter end of August, or any time in September, and occasionally till the middle or end of October; as in this season the spawn can be had in the best perfection and abundance, and the beds be made and prepared for the spawn to better advantage than later, when cold wet weather prevails; and the spawn will work sooner, and afford a more speedy and abundant crop during the winter: but beds for successional production, or where unavoidably omitted in autumn, may be made in November, or even as late as December.

The most suitable material for this purpose is horse-stable dung, which, as it heats too much at first for the growth of mushroom spawn, should always be prepared before it is worked up into the bed, in order to reduce it to a more moderate temperature, by forking it well up together in a heap for a week or two, and turning it over once or twice, that the rank burning steam may sooner and more effectually evaporate, before it heats in too great a degree: a quantity of the best moderately fresh dung should be procured,

E

proportioned to the size or extent of the bed, as at the rate of about three or four large cart-loads for a bed of twenty feet long. Some prefer the droppings of well fed horses only, for this purpose.

In regard to the dimensions of mushroom beds, they may be made of almost any extent in length, from ten feet to fifty or more, according to the quantity of mushrooms required; and from three feet to three and a half or four feet wide at the bottom, both sides gradually narrowed in a sloping manner upwards, till meeting together in a ridge at top, about three and a half or four feet high perpendicularly; which allows for settling to three and a half or less: the ridge-form is the most necessary to preserve the bed and spawn always effectually dry, which is very material in this culture. Besides, the sloping sides more quickly discharge the rain and snow, as well as afford the largest surface for spawning, and of course furnish a greater production. A single bed, of from ten or fifteen to twenty or thirty feet in length, may be sufficient for a small or middling family; and where the demand is more considerable, a greater number of beds may be prepared.

When the beds are made on the surface of the ground, first mark out the width and length of them; and if two or more are intended, they may be ranged parallel to each other, six or eight feet asunder.

In making the bed let the dung, prepared as advised above, be wheeled in, both long and short together, and with a light fork form the foundation of the bed, by shaking some of the longest dung evenly all along the bottom, four or five inches thick: then take the dung as it occurs, and work it into the bed, forming it at first to the full width, and gradually narrow it upwards, by drawing-in each side in a regular manner; and in advancing in length, raise it gradually into the ridge-form, to the full height, continuing it along regularly in the same manner and proportion; making the middle and sides equally full, beating the dung in firmly with the fork from time to time, as applied on the bed. Care should be taken to form both sides of an equal slope, the end being also equally sloped.

After the bed has been thus made, it must be permitted to remain some time, as a week, fortnight, three weeks, or more, till the first great heat has subsided, and the bed is reduced to a degree of mild heat proper for the spawn to be planted in, being kept during this interval fully exposed to the open air, day and night; and in case of excessive rains some dry long straw-litter should be thrown at the top, or thick garden mats spread over it, so as to shoot off as

much of the wet as possible, lest it either retard the heat, or occasion it to increase too violently. The operation of the heat, both in its increasing and decreasing state, should always be carefully attended to, as much depends upon the spawn being kept at a proper state of heat. In order to direct this, some long sharp-pointed sticks may be thrust down, in different parts, into the dung; and by drawing them up occasionally, and feeling them in the hand, a judgment may be more readily made of the state of the heat in the bed. The spawn should, however, be inserted as soon as the bed discovers a proper state of heat, and while it remains of a moderate lively temperature.

Others advise that these beds should be made on dry ground, and that the dung should be laid upon the surface; the width of them at bottom being about two feet and a half or three feet; the length in proportion to the quantity of mushrooms desired: then the dung should be laid about a foot thick, covering it about four inches with strong earth. Upon this bed more dung is laid, about ten inches thick; then another layer of earth, still drawing in the sides of the bed so as to form it like the ridge of a house, which may be done by three layers of dung and as many of earth.

The author of the Scotch Forcing Gardener, however, constructs his beds in this manner: he first lays about a foot in thickness of furnace ashes, brick-bats, or stone-chips, as a bottom, then six inches of rich horse-droppings, taken carefully from the stable every morning, and kept as whole as possible: these he suffers not in anywise to heat; and the whole time the bed is in preparation he exposes it to all the air in his power, provided it is perfectly dry. After this course has lain ten or twelve days, is quite dry, and there is no apprehension of its fermenting, he covers it to the thickness of two inches, with half vegetable mould of decayed tree leaves, and half light sandy loam, which should previously be well mixed together. Another course of droppings is then laid on as above, and, when it is also perfectly dry and past fermentation, covered with the same kind of mould as before. A third course of droppings and mould afterwards applied in the same manner finishes the bed. In the making, it should be gently rounded in the middle, especially if out of doors, in order to better carry off the wet. In this way the bed is generally a month or five weeks in making, and in as much more begins to produce, unless the weather or state of the droppings have been unfavourable. It is obvious, he says, that from the above mode of proceeding, a whole course of droppings cannot be laid on at once, unless there are a vast many horses, or the bed is of trifling

Dimensions: of course, when the last end of the bed is covered, proceed with the first, when in a proper state, a second time, covering it with mould as it advances.

Spawning the beds.—The beds being brought to a suitable state of heat for the reception of the spawn, proceed to planting it, having previously seen that it is somewhat dry. The spawn, and lumps or pieces of dung in which it is contained, are to be planted together, after breaking and dividing the large cakes, or lumps, into moderately small pieces, in the sloping sides and ends of the beds, in some of the following methods: as either by putting them into the dung just within the surface, and earthing them over an inch or two thick; on the surface of the dung, and earthed over; or by first earthing the bed an inch or two in thickness, and then spawning in the earth, adding an inch depth more over the whole.

In the first method, or that of *spawning in the dung*; the spawn, after being divided as above, is deposited just within the dung, at small distances, in rows the whole length of the bed; beginning the first row within half a foot of the bottom, and making a small aperture for each piece, by gently raising the dung with one hand, whilst with the other the piece of spawn is inserted; turning the dung down upon it close afterwards: proceeding in the same manner with the rest, at five or six inches distance in the rows, and the rows six or eight inches apart, a little more or less, according to the supply of spawn: when any pieces of spawn are very small, two, three, or more may be planted together in a place: thus advance in spawning both sides, and each end; after which, let the small crumbs remaining at last be laid evenly along upon the top; which finishes the business. Immediately smooth both sides and the ends of the bed with the back of a spade evenly, in order to fix and close the surface of the dung upon the spawn. The bed is then ready for earthing.

In beds of considerable extent, which retain the heat longer than those of smaller dimensions, it may be sometimes necessary to delay the earthing several days, or a week, or more, after being spawned, if doubtful of their renewing too violent a heat by immediately covering them closely.

The most proper earth for this purpose is good, rich, mellow garden earth, moderately light and dry; or where that of a light, mellow, loamy nature can be procured, either alone or mixed with other rich good earth, it will prove of still greater advantage in promoting the production of the mushrooms in size and substance. The earth being well broken down with the spade, and made free from clods and stones, apply the casing, or coat of earth, first along the bottom of

the bed, about an inch and a half to two inches thick, continuing it the same thickness regularly up the sides quite to the top of the bed, beating it lightly down with the back of the spade in laying it on; proceeding regularly over each side, the ends, and the top, smoothing the whole in a neat manner. After this the beds are ready for the straw covering.

The second mode, or that of *spawning on the surface*, often proves very successful in obtaining a forward and plentiful production, as the spawn, if in plenty, may be laid tolerably close together, over the surface of the dung, and earthed over two inches in thickness. The spawning should be begun close down along the bottom, in a row longitudinally; placing the pieces of spawn flat-ways upon the dung, closer or wider asunder according to the supply. This is to be earthed over two inches thick, and about six or eight inches up the bed the same thickness: then proceeding with another layer upwards, deposit the spawn, in the same manner as before, upon the dung, close along the upper edge of the first covering of earth, which supports it from slipping down; earthing this row over as the preceding, and then another course of spawn in the same manner earthed as the other; proceeding thus upwards along both sides and ends to the top of the bed.

The practice of *spawning in the earth* is effected by having the bed first earthed over, and the spawn afterwards inserted into it. In this case the pieces of spawn are inserted into the earth close down to the dung, at small distances, in a regular manner, equally over the bed, on both sides and ends from the bottom to the top, as in the two foregoing methods; and when thus finished, directly add a thin coat of fine earth about an inch thick, over the whole, smoothing it down light and evenly with a spade.

Protecting the beds, &c.—After the beds have been thus spawned, they must be covered with straw or litter to a considerable thickness, in order to defend them from the external air, and the effects of rain, snow, and cold, for which the same method of covering is applicable, and may be applied, either directly, or soon after the bed is spawned and finally earthed over, if the heat is then moderate: or if it be thought that immediate covering may renew too fierce a heat, it may be deferred a few days when the weather is dry and mild, but should always be done as soon as the heat of the beds will admit.

Clean straw, or long dry stable litter, are the proper materials for this use, either of which may be applied about half a foot thick at first, and gradually increased to double that thickness, so as to defend the beds effectually and preserve a kindly

growing warmth in them. This covering is to be shaken on lightly and regularly from the bottom, up both sides and ends and over the top, and should remain on day and night: it is also useful, in very rainy weather and during the winter, to spread some large thick garden mats all over the straw covering, which secure it better from being displaced by wind, and shoot off rain and snow, before they penetrate greatly, or get through to the beds. If, however, they have at any time penetrated much through the coverings, so that the litter next the beds is considerably wet, that part of it should be removed as soon as possible, and dry straw be applied in its place next the beds.

The beds should be very little exposed to the full air, especially in cold weather, except just to gather the produce; or occasionally, when it has received too much wet, in order to dry the surface for an hour or two in a dry mild day; or to remove decayed litter next the bed, till fresh is added in its stead; or sometimes in fine warm weather, in spring and summer, to have the benefit of a very gentle warm shower for a short time.

After management of the produce.—After the beds have been spawned and covered in about a month, the first production generally begins to appear, if the bed and spawn work kindly, though it is sometimes longer: at this time begin to examine the progress of the beds by turning up some of the coverings; and if successful, the running and knitting of the spawn may be seen; and, probably, some mushrooms be advanced to a proper size for gathering.

In gathering the mushrooms, choose, if possible, dry weather, during the cold seasons, when turn off the coverings from one side of the beds first; but, if the weather be mild and warm, uncover the whole at once; then looking carefully over the surface, gather all that appear above the size of middling round buttons, detaching them with a gentle twist of the hand, head and stem together, being careful not to disturb the younger growths which are advancing just within or above the surface of the earth; no part being left in the beds, as they would rot, become maggoty, and detrimentally infect the succeeding young plants: nor, in gathering, should any be permitted to remain to become very large flaps, but the whole be gathered while of a close, firm, fleshy nature. As soon as the business is finished, let the beds be directly covered over again with litter and mats.

Beds thus advanced to production often afford two or three successional gatherings weekly, while in full perfection, for six or eight weeks, rising all over the beds, in different degrees of

growth; though, sometimes, a bed will continue double that time in tolerably good bearing, or even four, five, or six months: but the produce is not so quick or abundant as in the more early state of the bed. They may be examined once or twice a week.

The autumn-made beds generally produce mushrooms in a shorter time, and more abundantly, than those of other seasons.

It sometimes happens that mushroom beds remain several months after they are spawned, without affording any product: in this case, when, upon examination, the spawn appears in vigour, its fibres extended, and smells well, it should not be too hastily disturbed, as it often breaks forth into activity all at once, and furnishes considerable crops: or to assist such beds, if the heat appears greatly or quite declined, it may be proper to apply a sort of lining of warm stable litter over the whole, having first spread a coat of dry long litter immediately next the beds, shaking the warm litter a foot thick over that, which by its kindly warmth sometimes revives the inactive spawn into a state of vegetation.

In summer, when any of the beds are in production, if very hot weather, and the earth of the beds be very dry, it may be proper occasionally to open them, and give a moderate sprinkling of water; or sometimes to expose them to the benefit of a very moderate shower of rain for a short time, covering them up again soon.

In beds of considerable time standing, where any of the coverings decay or become dung, they should be removed, and fresh ones applied in their stead.

Where mushrooms are raised by means of heat, it is found that they succeed best when beds are regularly kept to about fifty-five degrees; and that air is of little use.

AGAVE, a genus comprehending plants of the Aloe kind, as the *Great American Aloe*, or *Agave*, &c. They are herbaceous, ever-green perennials of the succulent tribe, in general of considerable growth, and the tender exotic kind.

It belongs to the class and order of *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

Its characters are: that it has no calyx; that the corolla is one-petalled, and funnel-shaped, with a six-parted equal border, and lanceolate erect parts: the stamina are filiform, erect filaments, longer than the corolla; the antheræ linear, shorter than the filaments, and versatile: the pistillum is an oblong germen, growing thinner towards both ends, inferior; the style filiform, of the length of the stamina, and three-cornered; the stigma headed and three-cornered: the pericarpium is an oblong, three-cornered,

three-celled, three-valved capsule, and the seeds are numerous.

There are several species: but those of most importance for the purpose of cultivation are, 1. *A. Americana*, Great American Agave; 2. *A. Virginica*, Great Virginian Agave; 3. *A. vivipara*, Viviparous or Childing Agave; 4. *A. foetida*, Fetid Agave; 5. *A. lurida*, Broad-leaved Vera Cruz Agave; 6. *A. tuberosa*, Tuberous-rooted Agave.

In the first sort, when vigorous, the stems generally rise to upwards of twenty feet in height, and branch out on every side, so as to form a kind of pyramid composed of greenish-yellow flowers, which stand erect, and come out in thick clusters at every joint. When these plants flower, they make a fine appearance, and continue a long time in beauty, if they are protected from the cold in autumn; as there will be a succession of new flowers produced for nearly three months in favourable seasons. It has been generally believed that this plant does not flower till it is a hundred years old; but this is a great mistake, as the time of its flowering depends on its growth: so that in hot countries, where it grows fast, and expands many leaves every season, it flowers in a few years; but in colder climates, where the growth is slow, it will be much longer before it shoots up a stem. The seeds do not come to maturity in this climate. It has been long preserved in gardens in this country, where, for many years past, there have been several of the plants in flower.

It has two varieties, that are in cultivation: the American Agave with gold-striped leaves, and the American Agave with silver-striped leaves.

Though plants of the common Agave have flowered in many different places, few of the variety with yellow-striped leaves have been yet seen in bloom in this climate.

The second species has so much resemblance to the first, as not to be distinguished from it except by good judges. The principal differences are, that its leaves are narrower towards their extremities, and of a paler green colour: the stems do not rise so high, or branch in the same manner; and the flowers are collected into a close head at the top, but are of the same shape and colour. It seldom puts out so many offsets as the common kind. This grows to a large size.

The third species never rises to a large size: the leaves are seldom more than a foot and a half long, and about two inches and a half broad at their base; these end in a slender spine, being slightly indented on their edges; are also reflex, and of a dark green colour. The flower-stem

rises about twelve feet in height, and branches out towards the top, in the same manner as the fetid sort: the flowers are nearly of the same size and colour with that, and after they fall off are succeeded by young plants in the same manner: hence it has obtained the title of Childing Agave. As it never produces any suckers from the root, it cannot be increased till the time of flowering.

The fourth species has long, narrow, stiff leaves, of a pale green colour, not indented on their edges, but frequently a little waved: the side leaves spread open; but those in the centre fold closely over each other, and strictly surround the bud. It is seldom more than three feet high; but the flower-stem rises near twenty, and branches out much like that of the first, but more horizontally, forming a regular pyramidal head: the flowers are of the same shape, but smaller and of a greener colour. In a plant that flowered here, they were succeeded by young plants, on their dropping off in the spring, the old plant dying soon afterwards.

The fifth species has considerable resemblance to the first sort, but is of a much more moderate growth; and the leaves are much thinner, the indentures on their edges abundantly closer, and not so deep: the spines too are blacker. The difference in flower is not yet well ascertained, few having flowered in this climate.

There is a variety of this plant in which the leaves are very narrow, not exceeding an inch and a half or two inches in breadth, and a foot and a half to two and a half in length, being rigid, stiff, and entire; and are terminated by a stiff black spine; the outward ones spreading in a horizontal manner. It never throws out suckers.

The sixth species has the leaves indented on their edges, each indenture terminating in a spine: the root is thick, and swells close above the surface of the ground; but in other respects it agrees with the species described above. The plants never put out suckers from the roots. The fructification of these two last species is not well known.

The roots in all the sorts are of the fibrous thick fleshy kind, which spread considerably; and they are all natives of America.

Culture.—In the cultivation of these plants some care and attention is necessary. They are propagated in different methods, according to the differences in the habits of the plants; as by offsets, parting the roots, seed, and planting the small plants formed on the flower-stems. When seed is employed, it should be procured from abroad, as it does not come to perfection in this climate.

All the species, as they are extremely succulent in their nature, require to be planted in such earth

as is of a light, dry and sandy kind; otherwise the roots are liable to rot and decay in the winter season, and the plants to be destroyed.

In the first and second sorts, and their different varieties, as they are very productive of suckers or offsets, especially the first, the culture may be readily effected in that way. These should be taken off from the roots any time during the summer season, and be then planted out singly in pots filled with earth of the above kind, plunging them into a hot-bed the heat of which is very moderate, a little water being previously given them. In this method they readily take root, and become plants.

The third and fourth species, as they rarely, or ever, produce offsets from their roots, cannot be propagated in the above manner. This is to be accomplished by setting the young plants, produced on the flower-stems, in pots of light earth, of the kind just mentioned, at the time of their dropping off in the spring, and then placing them in a hot-bed which has a rather higher temperature than for those of the preceding kinds.

But as this mode can only be practised when the plants flower, which is very long before it happens, it must be very tedious and uncertain. Another method may therefore be attempted, which is that of raising them by planting, in the same manner as above, pieces split off from the roots; which may be performed at the time the plants are removed into fresh pots in the summer.

The fifth and sixth sorts may be propagated in a manner similar to the last; but, as they are more tender than the above species, especially the latter, more care will be requisite.

In the after culture of all the different species and varieties, it will constantly be necessary to retain them in pots or tubs, which, in the two first, with their respective varieties, and the fifth kind, may be exposed in the open air during the summer months; the last being, however, put out somewhat later in the spring, and taken into the greenhouse something earlier in the autumn, than the others.

But the last three species, from their being of a much more tender nature than the two first, must be constantly protected in the stove during the winter season in this climate, their growth being even considerably checked when placed out in the open air in the summer months. It is therefore the most advisable practice, to let them have a pretty free admission of air in this situation, during the continuance of the hot season.

Very little or no water should be given them in the winter months, but in the summer it may be very sparingly applied once or twice a week. By this means the roots may be preserved in a

healthy condition, and their leaves be free from the attacks of insects.

The plants must be shifted annually, or every second year, in the summer season, into pots of fresh earth of larger sizes, according to their growth, taking care that they be not too large, as the plants are never found to thrive well unless their roots be in some measure confined. See SHIFTING OF PLANTS.

Those species that are of large growth, as the first and second, may be best in tubs; and as they often arrive at such sizes as to be moved with great difficulty and inconvenience before they attain the flowering state, it may be necessary to have the tubs set upon wooden frames fixed on low wheels, in order to facilitate the business of removing them into and out of the greenhouse. And as on this account they not only take up much room, but are troublesome in their management, it may be sufficient to cultivate only one or two of such large sorts.

The disposition of these plants to flower may be discovered by the expansion of the central leaves, and the appearance of the bud from which the future stem is to proceed. In cases where its progress is very tardy, artificial heat may be sometimes had recourse to, in order to advance its growth more rapidly. For this purpose a pit of suitable dimensions may be dug out, in which a hot-bed of dung, or tanner's bark and dung in mixture, may be formed and raised to the height of two or three feet. The pot or tub is then to be plunged into this bed, and the plant watered in the manner already recommended, due room being provided for the stem to rise in, if it be in a confined situation; but when in the open air a temporary covering should be made for its occasional protection against cold, &c.

It has been already observed to be a common opinion, that these plants do not arrive at the state of flowering in a shorter period than about one hundred years: this would seem, however, not to be regulated by length of time but the growth of the plant, which greatly depends on the warmth of the climate and other causes. As the flowering-stem comes out in the centre between the leaves that surround it closely and embrace each other, the coldness of this climate must necessarily retard the growth of the plant, by the unfolding of the leaves on which it so greatly depends being thereby much delayed, and of course the flowering of the plants be a work of considerable time. It often requires sixty, seventy, or even a greater number of years, before this expansion of the leaves has been effected; but when accomplished, the stems run up to their full growth with vast rapidity, often in the

course of two or three months. The economy of the plants is such, that they only flower once, but continue for some length of time; after which a complete dissolution of the plants takes place, in their roots, leaves, and stems.

All the different sorts are highly ornamental, both on account of their large singular leaves, and the extraordinary beauty of the flowers when they appear; the former being thick, fleshy, and erect; proceeding closely from the crowns of the roots in large clusters, and attaining different lengths according to the species, as from a foot and a half to six or eight feet, having the breadth of six or eight inches, with three or four in thickness, gradually decreasing in both the last to the extremities, where they terminate in thorny points: the latter in most of the species presenting themselves on branches proceeding from stems of great length on every side, in beautiful clusters of a pyramidal form and fine yellow colour, producing a grand effect.

The more hardy sorts are all well adapted for adorning lawns, courts, and other compartments in the immediate vicinity of the house, during the summer months, when placed out separately; as well as with the more tender and smaller kinds, to afford variety among the greenhouse and stove collections. The stripe-leaved varieties have a strikingly beautiful appearance in either situation.

The juice of the leaves of these plants, when expressed by bruising, and reduced to a proper consistence to be incorporated with some alkaline substance, has been found to answer as a substitute for soap in washing.

AGERATUM, a genus comprehending some plants of the herbaceous flowering annual kinds.

It belongs to the class and order of *Syngenesia Polygamia Aequalis*; and ranks in the natural order of *Compositæ Discoidææ*.

The characters of which are: that the common calyx is oblong, having many lanceolate subequal scales: the compound corolla uniform, with corollets, which are hermaphrodite, tubulous, numerous, equal, but scarcely longer than the calyx; proper-monopetalous, funnel-shaped, border quadrifid and spreading: the stamina are very short capillary filaments: the anthera cylindric and tubular: the pistillum is an oblong germ: the style filiform, and of the length of the stamina: the stigmas two in number, very slender and erect: no pericarpium: calyx unchanged: the seed solitary, oblong, angular, being crowned with a chaffy, five-leaved, upright-awned calycul: the receptacle naked, convex, and very small.

The species are, 1. *A. conyzoides*, Hairy Ageratum; 2. *A. ciliare*.

In the first the root is annual: the stem woody, square, reddish, and of about a foot and a half in height. The leaves are opposite, hairy, much serrate about the edges, an inch and a half long, and three quarters of an inch broad, petioled, resembling those of the nettle. Calyx ovate-cylindric, with two or three rows of scales, which spread very much when ripe. The receptacle is ovate-globular, and pitted. The seeds are small, columnar, smooth, blackish, being elongated at the base into a little white swelling navel: crown the length of the seed, and white: leaflets membranaceous, ciliate-toothed, ending in a long rough bristle-shaped awn. It flowers in July and August, and is a native of Africa.

The second has the stem herbaceous, two feet high, upright, thick, brownish and branched. The leaves sharpish, veined, smooth, and opposite. The flowers terminate in a sort of umbel. The calyx is almost ovate. The corollets are five-cleft; the crown of the seeds having five cusps. It is a native of the East Indies.

Culture.—These plants are propagated by means of seed, which should be sown on a hot-bed of a moderate temperature, in a light fine mould. After the plants have become sufficiently strong, they should be transplanted into a second bed of the same kind, carefully watering and shading them until they have taken fresh root, when air should be pretty freely admitted when the season is warm.

About the beginning of June the plants may be gradually inured to the open air; and towards the middle of the same month transplanted into the situations where they are to remain in the open ground. The seeds become ripe about September.

As these plants are not of tall growth, and continue in flower for a considerable length of time, they may be planted in the anterior parts of the clumps and borders of pleasure grounds, where they may serve the purpose of ornament, and at the same time afford a suitable variety.

AGRIMONIA, a genus affording several herbaceous perennial plants of the *Agrimonia* kind.

It belongs to the class and order of *Dodecandria Digynia*, and ranks in the natural order of *Sciticosæ*.

Its characters are: that the calyx is a one-leaved, five-cleft, acute, small, superior, permanent perianthium, fenced with an outer calyx: the corolla has five flat, emarginate petals, with the claws narrow, inserted into the calyx: the stamina are capillary filaments, shorter than the corolla, inserted into the calyx; the antheræ small, twin, and compressed: the pistillum is a germ inferior; the styles simple, of

the length of the stamina: the stigmas obtuse: no pericarpium: the calyx contracted at the neck, and hardened: the seeds are two, and of a roundish form.

There are several species, but those that deserve to be cultivated as ornamental plants are,

1. *A. odorata*, Sweet-scented Agrimony;
2. *A. repens*, Creeping-rooted Agrimony;
3. *A. agrimonoides*, Three-leaved Agrimony.

The first sort rises to near four feet in height, the leaves having more pinnas than in either the common or white kinds; and they are also longer and narrower, ending in acute points: the serratures are sharper, and when handled they emit an agreeable odour. The flower-stems are branching, and the flowers stand on longer peduncles than in the common sort. It is a native of Italy.

The second species is of a more humble growth, seldom rising above two feet high: the pinnas of its leaves are longer and narrower than those of the former, and the spikes of flowers very short and thick. The roots spreading widely, it multiplies faster than the common sort: the seeds also are much larger and rougher. It much resembles the foregoing, but the stems are shorter, thicker, and hirsute: the stipules, being the length of the interstices, are reflected, and almost cover the whole stem, and the end-lobe is not pedicelled. The spike is short, dense, sessile, with bractæ the length of the flower.

In the third, the root-leaves are pinnate, with two or three pairs of pinnas, and smaller ones intermixed; the end-lobe larger than the others: the pinnas ovate, villous, and toothed: the stem-leaves are ternate: the bractæ ovate and acuminate: the flowers in corymbs; small, yellow, rarely six: the calyx is ten- or twelve-cleft: the petals ovate, obtuse: the stamina seldom more than eight, tender, yellow. This attains the height of about three feet. It is a native of Italy and Carniola.

Culture.—The cultivation of these plants requires no difficulty, as they are of a hardy nature, and thrive in almost any soil or situation. They may be readily propagated by parting the roots, which should be performed in the autumn, in order that the plants may be well established before the spring. As their roots spread extensively, they should not be planted out nearer together than two or three feet. They are likewise capable of being raised from seed, which should be put into the ground at the same season as in the other method; for where the sowing is deferred till the spring, there are seldom any plants produced that season. The first mode is, however, the most expeditious.

All the sorts may be found useful as plants of

ornament and variety, when placed in assemblage with those of other kinds, in beds and borders where various plants of easy culture are required. The first sort, besides the ornament which it affords by the tallness of its growth and the beauty of its flowers, is held in esteem for the fragrance which is emitted from its leaves, flowers, and other parts.

As these plants, though perennial in root, are only annual in the stems, they should be cut off and cleared away every autumn, as soon as they have perfected their seed.

AGROSTEMMA, *Wild Lychnis* or *Rose Campion*. The plants of this genus are of the hardy herbaceous, annual, and biennial-perennial kinds.

It belongs to the class and order of *Decandria Pentagynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a one-leaved, coriaceous, or leather-like, tubulous, five-toothed, permanent perianthium: the corolla has five petals, with claws of the length of the tube of the calyx; and border spreading, obtuse, and undivided: the stamina are ten awl-shaped filaments, five alternately later than the other five, inserted into each claw of the petals: the antheræ simple: the pistillum is an ovate germ, with filiform, erect styles, of the length of the stamina, and simple stigmas: the pericarpium an oblong-ovate, covered, one-celled, five-valved capsule: the seeds are very numerous, kidney-shaped, and dotted: the receptacles free, as many as seeds; the interior ones gradually longer.

There are a number of different species, but those for cultivation as ornamental plants are, 1. *A. coronaria*, Rose Campion: 2. *A. Flos Jovis*, Umbellate Rose Campion.

The first of these species, in its natural state, has the corolla white, with the middle red; and it has the habit of the species below, but is harder, more pulpy, and more tomentose. The calyxes are much harder, callous, and covered with a white pile, with hard thick ribs, not green hairy lines as in that: the petals are much broader, slightly emarginate: the auricles bifid: the flowers not heaped into an umbel, but scattered on the branches of the stem on very long peduncles. Native of Italy and the Valais.

There are three varieties of this plant: one with deep red, another with flesh-coloured, and a third with white flowers: and the Double Rose Campion, with a large crimson flower, which is chiefly cultivated as being an elegant and beautiful flower.

In the second, the stem is erect, dichotomous at the top, and covered with a white nap. The leaves are conjugate, connate, ovate-lanceolate, quite entire, erect, and pressed to the stem, being



Painted by J. Edwards

London, Published June 1 1803 by G. Kearsley, Fleet Street

Reprinted by J. Kearsley

Agrostemma coronaria
1 Rose campion

Anchusa officinalis
2 Official Bugle

Aquilegia canadensis
3 Canadian Columbine

Actaea racemosa
4 American Herb

all over nappy. The flowers from the top and forks, solitary. The flower-stem rises near a foot or a foot and a half high, and the flowers grow in umbels on the top of the stalk, and are of a bright red colour. It flowers in July, and the seeds ripen in September. It is a native of the mountains of Switzerland.

Culture.—In cultivating these plants all the single kinds may be easily propagated by the seeds, which may be sown either in the spring or autumn on a bed of common earth; and after the plants have attained the height of about three inches, they should be pricked out into another bed, at the distance of six or seven inches from each other, water being immediately applied in not too large a quantity, and afterwards occasionally repeated. In the autumn or spring following the plants will be in a proper situation to be transplanted into the places where they are to remain for the purpose of flowering in the ensuing summer months. And as the plants frequently come up from the self-sown seeds with equal strength and vigour, these may be transplanted in the same manner, and often succeed fully as well.

As the double sorts afford no seed, they can only be propagated by parting the roots; which, as they mostly afford abundance of offsets, may be easily effected. This should be performed in the autumn, as soon as the flowering is over, every head being parted that can be slipped off with roots. These should then be planted out in fresh ground that has not lately received any manure, at the distance of six or seven inches from each other; water being applied in a sparing manner until they have taken fresh root, after which it must be wholly omitted, as much moisture is very prejudicial. In the spring they should be put into the situations where they are to remain for flowering.

A few plants may likewise be placed in pots of good fresh mould, in order to be set out in the yards or other compartments about the house.

The second sort admits of the same methods of cultivation, but succeeds best in a rather moist soil, where the situation is somewhat shady.

Both the species and all varieties are well suited for the purposes of ornament, affording a very agreeable diversity in clumps and borders.

AILANTHUS, a genus comprising a tree of the hardy exotic kind, and of lofty growth.

It belongs to the class and order of *Polygamia Monœcia*.

Its characters are: that it has male and female hermaphrodite flowers: the calyx of the male is a one-leafed, five-parted, very small perianthium: the corolla has five petals, lanceolate, acute, convolute at the base, and spreading: the stamina

have ten filaments, compressed, of the length of the corolla: the antheræ are oblong and versatile: the calyx of the female is like that of the male, permanent; the corolla the same: the pistillum has from three to five germs, curved inwards: the styles are lateral, and the stigmas capitate: the pericarpium has as many capsules as there are germs, compressed, membranaceous, sabre-shaped, acute, on one of the edges emarginate: the seeds are solitary, lens-shaped, bony, close to the emarginature: the calyx of the hermaphrodite is the same with that of the male and female: the corolla the same as in the male: the stamina have two or three filaments, as in the male: the pistillum, pericarpium and seed as in the female.

There is only one known species, which is the *A. glandulosus*, or Tall Ailanthus.

It rises with a straight trunk to the height of forty or fifty feet: the bark is gray, slightly furrowed, and has white marks on it: the young twigs are covered with a fine velvet down. The leaves are large, smooth, alternate, unequally pinnate, and disposed horizontally. The common petioles form an angle more or less acute, or sometimes a right one with the branch: they are slender, and from one to two feet in length. The leaflets are from twenty to thirty, alternate and opposite, from two to three inches in length, and from one to two in breadth, standing on a short petiolule; and laterally towards the base are some blunt teeth glandulose beneath: the rest of the leaflet is commonly entire. The flowers are of a white colour, very numerous in a close terminating panicle, usually in groups on a common peduncle, each flower being on its proper pedicel: they are male and female, with a few hermaphrodites: the males are the most numerous. A disagreeable odour is said to issue from the flowers. It was supposed to be a species of *Rhus*, before the nature of its fructification was understood. It is a native of China.

In this climate it has yet produced only male flowers; but in France and Holland it has borne female flowers and fruit: the latter, however, has not ripened. Some years it bears only male flowers; but in France, about twice in ten years, it has produced both male and female flowers.

Culture.—In the propagation of this tree, the best and most easy method is that by the young plants which proceed from the root near to the surface of the ground. These should be taken up in the early part of the spring, and then be planted out in good land, in an open exposure; at the distance of a foot or eighteen inches from each other, where they may remain for two or three years. They may afterwards be transplanted into the proper situations.

They may likewise be raised by cutting some of the smaller roots, and then turning them up.

It is a tree that grows very fast in this climate, and from its being handsome, and rising to a considerable height, is proper for ornamental plantations, or large clumps in pleasure grounds. If the bark be wounded, a resinous substance issues from it, which soon hardens. Its wood is hard, heavy, glossy like satin, and susceptible of taking a very fine polish. It may of course be made use of for various purposes.

AIR, when considered in respect to vegetation, is the thin medium which surrounds, and becomes intermixed with, the particles of the soil; and in this way, as well as by being absorbed and taken up by the organs of plants, contributes in a great measure to their health, growth, and support.

It is a substance possessed of weight or gravity, and capable of being compressed; but not condensable in the heat of the atmosphere without combination. Without the aid of this medium, vegetables could not live, fire be maintained, or heat generated. But though the atmosphere be the vast laboratory in which nature performs various operations, solutions, precipitations, and combinations, and the grand receiver in which all the attenuated and volatilized productions of terrestrial bodies are lodged, mingled, agitated, combined, and separated; still the air is the same in respect to its qualities, being decidedly characterized by the two properties of supporting respiration and combustion. This is sufficiently evident from combustible bodies not being burnt without the contact of atmospheric air, as in *vacuo* this process does not take place. From respiration and combustion not continuing beyond a certain length of time in a given quantity of atmospheric air, it is likewise obvious that only a part of the air that surrounds the earth is proper for the support of either animal or vegetable life, or combustion, the other being improper for these purposes. Hence it is evident that atmospheric air is a compound of two different sorts of air: the one supporting respiration and combustion, and on that account denominated *vital air*, *pure air*, or *oxygen*; the other injurious in these respects, but necessary in a certain proportion, in order to modify the too powerful action of vital air, or oxygen, in the respiration of animals: this is termed, from its properties, *azote* or *phlogisticated air*. One hundred parts of common or atmospheric air contain twenty-seven of the oxygenous or pure air, and seventy-three of the azotic or nitrogen air, as has been shown by the late experiments in chemistry.

Besides these principles, the common or atmospheric air also contains a proportion of *fixed*

air, or what is now termed *carbonic acid gas*, from carbonaceous matter, or charcoal, forming one of its constituent principles. The vital air, or oxygen, by combining with other bodies, produces different new compounds that may be of great utility in the vegetation of plants.

Long before the discoveries in modern chemistry had ascertained the constituent principles of common air, it had been remarked to be a principal agent in the vegetation of plants by Mr. Ray, in the *Philosophical Transactions*, who found that lettuce seed, which was sown in the glass receiver of the air-pump, exhausted and cleared from all air, grew not at all in eight days time: whereas some of the same seed, which was sown at the same time in the open air, had risen to the height of an inch and a half in that time: but on the air being let into the exhausted receiver the seed grew up to the height of two or three inches in the space of one week. The ingenious experiments that have been lately made by Mr. Gough, and detailed in the *Transactions of the Manchester Philosophical Society*, have still more clearly demonstrated, that the vegetation of most sorts of seeds depends in a great measure upon the presence of the oxygenous principle of the air. And another proof of the utility of air in vegetation is met with in the *Sedum*, which pushes out roots without earth or water, and lives several months. Some sorts of *Aloes*, if hung up in a room entirely secured from frosts, will remain fresh for some years, though they sensibly lose in their weight.

Air also operates within the earth, and, from the changes which it undergoes, and the new combinations that are formed in consequence of them, contributes greatly to promote the growth of plants.

Thus it has been observed by the author of the *Philosophy of Gardening*, that as most earths contain carbon, and other inflammable materials that are capable of uniting with oxygen, and by that means afford carbonic or other acids; as well as water which, by its decomposition when in contact with confined air, forms ammonia, or volatile alkali, by its hydrogen combining with azote, and nitre by the conjunction of its abundant oxygen with another portion of the abundant azote or nitrogen of the atmospheric air, there is good ground to conclude that the great utility of turning over the earth by the spade, may arise from the production of such effects, by the confining of the oxygen, as well as the azote or nitrogen, of the air in the pores among the particles of the mould: and as these effects must be produced more extensively and more readily, in proportion, as the particles of the earth are more perfectly broken down and

reduced, the advantage of frequent digging, or turning over the earth, in the practice of gardening, is rendered sufficiently evident.

Besides, as the heat of the air is given out in the union of oxygen with carbon, as is fully demonstrated by the heat that takes place in hot-beds; it would seem to show, that in the culture of roots or plants, the seeds and sets should be sown and put into the ground as soon as possible after the beds have been dug over, while the above processes are going on, and the heat is evolving, as by this means their vegetation and growth may be the most effectually promoted.

Air was considered by the learned Dr. Hales to be a fine elastic fluid, with particles of very different natures floating in it, whereby it was admirably fitted, by the great Author of nature, to be the breath or life of vegetables as well as animals, without which they could no more live and thrive than animals; and as a proof of the great quantities of it in vegetables, he refers to the third chapter of his excellent Treatise on Vegetable Statics, where he remarks, in the experiments on vines, that a great quantity of air was visible, which was continually ascending through the sap into the tubes; which manifestly shows what plenty of it is taken in by vegetables, and is perspired off with the sap through the leaves. He likewise details several experiments made on branches of apple, apricot, birch, and other trees, to prove the same thing.

And Dr. Grew remarks, that the pores are so large in the trunks of some plants, as in the better sort of thick walking-canes, that they are visible to a good eye without a glass: but with a glass the cane seems as if stuck at top full of holes with great pins, so large as very well to resemble the pores of the skin in the ends of the fingers and ball of the hand. In the leaves of pines he likewise observes, that by means of a glass they make a very elegant show, standing almost exactly in rank and file through the length of the leaves; whence he thinks it may be probable that the air enters plants, not only with the principal food or nourishment by the root, but also through the surface of their trunks and leaves, especially at night, when they are changed from a perspiring to a strongly imbibing state.

It is observed by the former of these writers, however, that in all the experiments he tried for this purpose, he found that the air entered very slowly at the bark of young shoots and branches, but much more freely through old bark; and that in different kinds of trees it had different degrees, or more or less freedom of entrance; and likewise that there is a portion of air both in an elastic and unelastic state, mixed with earthy

matter, as he found by several experiments which are detailed in his work.

Mr. Boyle also, in making experiments on air, among other discoveries, found that a good quantity of it was producible from vegetables, by putting grapes, plums, gooseberries, peas, and several other sorts of fruit and grain, into exhausted and unexhausted receivers, where they continued for several days, emitting great quantities of air. These led Dr. Hales to further researches on the subject, in order to discover what proportion of air he could obtain from the vegetables in which it was lodged and incorporated; and he concluded that it was abundant in vegetable substances, and bore a considerable part in them.

Some kinds of earth, as well as substances of the manure kind, are found to contain much larger proportions of air, and to yield or part with them with much greater ease and facility than others: a circumstance which has much influence in the practice of gardening, and the growth of different sorts of vegetables.

Numerous experiments that have been more recently made, have, however, in consequence of the knowledge that has been acquired of the constituent principles of the air, from the ingenious inquiries of Black, Cavendish, Priestley, and others in our own country, and the exertions of Lavoisier and other chemical philosophers on the continent, brought us more fully acquainted with the causes of the numerous beneficial effects that are daily produced on vegetation by the agency of the atmospheric air.

It has been ascertained, that both of the principles which constitute atmospheric air are highly beneficial in the œconomy of plants; and that by their different combinations with other matters they contribute greatly to vegetation, as has been already seen.

And it has been shown above, that the vegetative process of grain, seed, and other vegetables, is greatly promoted by the free and easy access of the air; which strongly enforces the necessity of pulverizing and rendering the soil in a state of considerable fineness before they are introduced into it. Seeds and plants can grow in the moisture of the air, and in water, without the intervention of earth; but neither of these is sufficient for the purpose without the free admission of air. Many plants of the succulent kind retain their vegetative quality a considerable length of time, merely by the agency of the air; and some emit roots from the branches that are cut from them, on being exposed to the air, without the assistance of either earth or water. The *Sedum* and *Sempervivum* afford examples of this kind. Air is likewise necessary in order to preserve the vegetative faculty of grains and seeds while they

are kept for the purposes of sowing, as is evinced by inclosing them in vessels closely stopped and prevented from receiving air; for under such circumstances their germinating property is found to be either completely destroyed or greatly impaired. On this account many sorts of grain and seeds may be considerably injured and retarded in their vegetation, by being deposited too deep in the ground. There are, however, many seeds which are able to retain this faculty, though for a long time buried deep in the soil, as is evident from their readily coming up on the earth being turned up to a great depth by the spade or other means.

A free exposure to the action of the air is also requisite for the vigorous growth of trees, shrubs, and culinary vegetables, as is shown by their becoming weak and puny in confined or shaded situations. Fruit is also much injured by the trees being crowded, or having too great a quantity of wood in them. Air is therefore equally necessary to the vegetation and growth of plants, as to the life of animals.

On these accounts, therefore, all such plants as are confined under frames and glasses, or preserved in greenhouses and stoves, should be exposed as much as possible in the middle of the day, when the weather is suitable to the free influence of the air, as where this is neglected they are liable to run up too much, become feeble, lose their colour, and soon die. All the more hardy kinds, that only demand protection in severe seasons, should likewise have the full benefit of the open air every day in proper weather, by removing the glasses or other coverings. And even the tender kinds, that require the constant protection of glasses and the aid of artificial heat, as early cucumbers, melons, pines, &c. should have it cautiously admitted by propping up the glasses, &c. for a short time, in proportion to the state of the heat and the temperature of the external air, as without this they seldom succeed well, or produce fruit of a good flavour.

AITONIA, a genus comprehending a shrub of the elegant greenhouse kind.

It belongs to the class and order of *Monadelphia Octandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved, erect, four-parted, short perianthium, divided into four ovate, sharp segments: the corolla has four erect, equal, broadly-ovate, concave, very obtuse petals: the stamina have filaments, joined as far as the middle, divided above into eight, awl-shaped, furrowed, standing out of the corolla, and having ovate, furrowed antheræ: the germ superior, ovate, smooth, and subangular: the style one, filiform, of the same

length with the stamina: the stigma obtuse, undivided: the pericarpium is an ovate, dry, membranaceous, four-cornered, one-celled, brittle berry: the corners are produced and sharp: the seeds many, fixed to a column, globular and smooth. It varies with five-cleft, ten-stamened flowers.

There is only one species at present known, which is the *A. Capensis*, or Cape Aitonia.

In this the stalk is shrubby, six feet high, the branches being alternate, roundish, wrinkled, erect, and smooth: the leaves in bunches, lanceolate, obtuse, quite entire, and smooth: the peduncles lateral, solitary, one-flowered, smooth, shorter than the leaves, and often recurved: the petals scarlet: the antheræ yellow, striped with brown: fruit resembling that of the winter cherry. But in this climate it is of slow growth, seldom exceeding three feet in height. After it is of sufficient age, it produces flowers and fruit through most of the year. The segments of the calyx, and the petals, are red at the ends; and the fruit is large, angular, and of a fine red colour. It is a native of the Cape.

Culture.—The propagation of this shrub is easily effected by means of the seed, which sometimes become sufficiently ripe in this climate.—They should be sown in pots of good mould in the early part of the spring, and then plunged in a hot-bed of moderate temperature. When the young plants are sufficiently strong, they may be removed into larger pots, and receive the same after-management as other plants of the tender greenhouse or stove kinds.

AJUGA, a genus comprehending several plants of the *Bugle* kind, which are herbaceous perennials for the purpose of ornament.

It belongs to the class and order of *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved, short perianthium, cut half way into five clefts, with the segments nearly equal: the corolla is monopetalous and ringent: the tube cylindrical and bent in: the upper lip very small, erect, bifid, obtuse; middle division very large and obcordate, side ones small: the stamina have subulate, erect filaments, longer than the upper lip: antheræ twin: the pistillum has a four-parted germ: style filiform, and with respect to situation and length, as in the stamina: stigmas two, slender, the lowest shorter: no pericarpium: the calyx, which is converging, fosters the seeds, which are somewhat oblong.

The species that are deserving of notice for the purpose of cultivation are: 1. *A. reptans*, Common Bugle; 2. *A. decumbens*, Creeping Japanese Bugle; 3. *A. pyramidalis*, Pyra-

midal Blue Bugle; 4. *A. Genevensis*, Geneva Bugle; 5. *A. Orientalis*, Eastern Inverted White Bugle; 6. *A. Alpina*, Alpine Bugle.

The first species has the stalk upright, six inches high, hairy, and of a purple colour: the leaves ovate, narrowing to the base, connate, toothed, veined, in winter of a purple colour: the floral leaves smaller and shorter: the flowers are in whorls one above another, forming in the whole a spike: the calyx is hairy, nerved, and blueish: the corolla blue with white veins. It flowers from May to June, or longer.

There are two varieties of this plant—one with white flowers, and the other with pale purple flowers.

The second species sends up many stems, which are simple, or but little branched, decumbent with the ends standing up, four or five inches in length: the root-leaves many, larger than those on the stem, all petiolate, of an oval oblong form: the whole plant is villous: the flowers are in whorls, small and blue.

The third has a single stem, four or five inches in height, and very hairy, clothed with leaves pointing four ways: root-leaves oblong-wedge-shaped, sessile, entire: stem-leaves oval or oblong-obovate, slightly toothed or scalloped, not three-lobed, but diminishing upwards, so as to give the whole plant somewhat of a pyramidal form; the upper ones tinged with purple: the bractæ longer than the flowers, which are axillary, not more than three together: the calyx very hairy: the corolla narrow, twice as long as the calyx, and hairy at the tip; it has no runners. It flowers in April, or later in this climate. It is a native of most parts of Europe.

There are two varieties of it—one with red flowers, and the other with white flowers.

The fourth species approaches near to the common sort, but the leaves are downy, and the calyxes very rough. It grows wild about Geneva, as well as in many of the southern countries of Europe.

There are two varieties of this plant; one with white, the other with red flowers.

The fifth has the stem a foot and a half in height, upright, perennial, and of a brownish purple colour. The leaves are ovate, sharpish, crenate, and tomentose underneath. The flowers are of a purplish cast, terminating and axillary, in spikes. The calyx is sharp, hirsute, converging; the corolla having scarcely any upper lip, but two very small divaricating segments, adhering on each side to the lower lip, which is trifid. It was brought from the Levant.

There is a variety of this plant which has blue flowers.

The sixth species has the leaves much longer than those of the common sort: the stalks are

weaker, and decline on every side; and the whorls of flowers are much smaller, and more distant: it varies from the second, in having the leaves wrinkled, more ovate and crowded, hirsute, the petioles being shorter and broader, the spike proceeding immediately from the root.—At the top of the root are circles of leaves, whence arise leafy stems, four or six inches high. The leaves are ovate, hirsute, hispid, with three strong nerves. From each axil proceed three flowers; of which the two side ones are on shorter peduncles. The calyx is inflated, divided beyond the middle, two-lipped, the two upper segments approximating. Two obtuse toothlets form the upper lip of the corolla: the lower lip has the large middle segment rose-coloured with purple lines. The whole stem is hirsute, flower-bearing, and leafy; the flowers being concealed among the leaves, of a deep blue, not white colour; the bractæ green, not coloured. It grows naturally on the Alps.

Culture.—These are plants that require but little care in their cultivation, especially the four first species. As they all of them send off numerous side shoots, they may be readily propagated by means of them. These may be taken off, and planted out, either in the autumn or spring, in such borders or other situations as have rather a moist soil, and a slight degree of shade. The latter period is, however, in general, to be preferred.

As the plants are apt to spread out considerably, they require to be cut in occasionally; which is all the after culture that will be necessary.

The fifth and sixth species, as they send off side shoots much more sparingly, may be more easily and expeditiously raised by means of the seeds, which should be sown in pots of good loamy earth, immediately after they become ripe, and be then placed in a moist shady situation till the autumn, when they must be removed under a frame. In the early spring, as soon as the plants are in a proper state of vigorous growth, they should be transplanted into separate pots, filled with good loamy mould, and set out in some shady place during the summer season, being removed on the approach of winter, under a common frame, and exposed as much as possible to the open air when the weather is mild; but in case of frost, be protected by the glasses, or some other covering.

ALATERNUS. See RHAMNUS.

ALBUCA, *Bastard Star of Bethlehem*, a genus which furnishes different bulbous-rooted herbaceous perennial plants of the flowery ornamental kind.

It belongs to the class and order of *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters of which are: that it has no calyx: the corolla has six oblong-oval permanent petals, the three outer spreading, and the three inner converging: the stamina have filaments shorter than the corolla; three opposite to the inner petals, linear-subulate, complicate a little above the base, then flat, three opposite to the outer petals, thicker; antheræ on the former oblong, fixed to the inflex tip of the filament, below the middle upright; on the latter, similar, but effete, or none: the pistillum has an oblong triangular germ: style three-sided: stigma a triangular, three-celled, three-valved capsule: the seeds numerous, flat, lying over each other, and widening outwards.

The species are numerous; but those mostly for the purposes of ornament are: 1. *A. altissima*, Tall Albucca; 2. *A. major*, Great Albucca; 3. *A. minor*, Small Albucca; 4. *A. courcateda*, Channel-leaved Albucca; 5. *A. spiralis*, Spiral-leaved Albucca.

In the first species the leaves are so deeply channelled as to be almost rolled into a cylinder; two feet long, and almost three inches broad at the base. The scape a little shorter than the leaves, the thickness of a finger. The raceme two feet long or more. The peduncles bent downwards in the season of flowering, afterwards spreading and becoming finally erect; they are three inches in length. The bractæe green, except at the edge, where they are of a clear white, an inch long. The flowers are of a white colour; and the petals more than an inch in length; the outer ones sharp and thickened at the tip, but the inner blunt, bent in, and having a twin gland, composed of two globes, at the end. The fertile filaments are waved on the edge, with the antheræ curved inwards beneath the glands of the petals: the barren filaments are triangular, furrowed on the outside, a little longer than the others, and have no antheræ. The germ is subpodicelled. The style obversely pyramidal, the length of the germ, covered with glandulous scales: the angles terminate in subulate horns, covered also with scales; the centre being elongated into a pyramidal stigma. It flowers in April and May.

In the second the scape is a foot high, upright, roundish, very minutely streaked, smooth, and ash-coloured, with a glaucous bloom on it. The leaves are sharp, smooth, and streaked, a foot long. The bractæe are sheath-form, lanceolate, concave, with a long linear-subulate tip, red, nerved, smooth, straight, and solitary, at the base of the peduncles. The raceme terminating, long, of a crimson colour, and smooth: the flowers alternate, peduncled, slightly nodding; there being fewer at bottom. The peduncles round, smooth, one-flowered, longer

than the bractæe, and spreading. The petals linear, longitudinally nerved, marcescent; the three outer broader, a little concave, red, blunt at the end, bent in with a small marginal scale; the three inner narrower, upright, pale red, with a broad, thin, membranaceous, whitish rim on each side, and an ovate, membranaceous, inflex scale at the tip. The filaments erect, the length of the corolla, linear, membranaceous, whitish, joined at the base, inserted into the receptacle; they are alternately free, and fastened below by a broader base to the inner petals. Antheræ from incumbent upright; on the loose filaments barren; on the three others whitish with yellow pollen, linear, blunt at each end, emarginate, a little curved inwards, convex at the back, plano-concave in front, twin-furrowed. The germ fleshy, pyramidal-cylindric, blunt, crimson, smooth, with three calluses at the tip, on a short peduncle, ending in several small blunt teeth pressed close to it. The style very thick, somewhat flattened, with two of the angles nearer to each other, a little attenuated at the base, pubescent, red, shorter than the germ. The stigma blunt, of a yellowish red colour, pubescent at the edge. Capsule oval, smooth, transversely nerved, compressed, with two rims along the back. The seeds are orbiculate. It flowers in May.

In the third the leaves are a foot long and more, half an inch broad at the base. The scape half a foot high, scarcely a line in diameter. The raceme six inches in length, or even longer. The peduncles an inch and a half long. The bractæe are green, with clear white edges, half an inch long, quickly withering. The flowers yellow. The petals less than an inch in length; the outer ones thickened at the tip; the inner having a white, inflex, kidney-shaped gland. Barren filaments, linear, with a filiform inflex tip, and no antheræ. The style obversely pyramidal, the length of the germ, covered with glandulous scales. The stigma pyramidal, prominent between the inner converging petals. It flowers in May and June.

The fourth species has the leaves linear-subulate, deeply channelled, two feet long and upwards, scarcely half an inch wide at the base. The scape a little shorter than the leaves, and not so thick as a goose quill. The raceme close, half a foot in length. The peduncles spreading, a little more than an inch in length. The bractæe are almost the length of the peduncle. The flowers yellow. Outer petals oblong, thickened at the tip, above an inch in length; the inner ones oval, a little shorter than the outer ones. Barren filaments, somewhat shorter than the fertile ones, convex without, channelled within; the antheræ sagittate and effete. The style prism-

shaped, the length of the germ, and terminated by a stigma from the angles of the style rounded at the tip. It flowers in May.

In the fifth the root-leaves are few, linear-filiform, upright at bottom, then spiral, and when the plant is more mature, flexuose, villose-scabrous, shorter than the scape, which is simple, filiform, flexuose, nodding at the top, streaked, villose-scabrous, of a finger's length, seldom a span long after flowering, one-flowered, seldom two-flowered. The bractea lanceolate, acuminate, shorter than the peduncle. There are three filaments without antheræ.

They are all natives of the Cape.

Culture.—The best method of propagating these plants, is by means of offsets from the roots, which should be taken after the plants have flowered in the summer months. These are then to be planted out in pots filled with good light mould, and placed under the protection of hot-bed frames during the winter season. In this way they mostly succeed and produce flowers. But it is a better practice, where the convenience of a border can be had in the front of the greenhouse or stove, to plant them in the natural ground in these situations, as in this method they both thrive better, and flower with more vigour than when kept in pots.

The third sort is asserted by Miller to be capable of being raised from seeds, when they can be procured from abroad, as they seldom or ever ripen any in this climate.

The second species is also said to be of so hardy a nature, as sometimes to succeed when planted out on a border of light earth, in the open ground. All the species are ornamental, and afford variety in the greenhouse or stove.

ALCEA, a genus including a great variety of plants of the *Hollyhock* or *Rose Mallow* kind, which are fibrous-rooted, hardy, herbaceous flowering perennials of tall growth.

It belongs to the class and order of *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

Its characters are: that the calyx is double, each one-leafed; the outer cut half way into six parts, permanent and very spreading; the inner cut half way into five parts, larger and permanent; the corolla consists of five obcordate, emarginate, spreading petals, coalescing at their bases: the stamina are filaments uniting into a sort of five-angled cylinder at bottom, loose at top, and inserted into the corolla: the antheræ almost kidney-shaped: the pistillum has a germ orbiculate, style cylindric, short, stigmas about twenty, setaceous, of the length of the style: the pericarpium is composed of many jointed arils, in a ring round a columnar flattened receptacle,

parting and opening on the inside: the seed is one, flat, kidney-shaped, in each aril.

The species which are cultivated are; 1. *A. rosea*, Common Hollyhock; 2. *A. fricifolia*, Fig-leaved or Palmated Hollyhock; 3. *A. Africana*, African Hollyhock.

In the first species the stem rises to a considerable height, as seven or eight feet, and has roundish leaves which are cut at their extremities into angles. It grows naturally in China, from whence the seeds are often procured. On this account it is sometimes known by the title of Chinese Hollyhock. The differences in the colours of the flowers, as well as their being single or double, are accidental, arising chiefly from cultivation.

There are many varieties of the Hollyhock: as those with white flowers,—with cream-coloured flowers,—with flesh-coloured flowers,—with pale red-coloured flowers,—with deep red-coloured flowers,—with blackish red flowers,—with purple-coloured flowers,—with pale yellow-coloured flowers,—with deep yellow-coloured flowers,—with variegated flowers.

In the second species the stem likewise rises much in height, as five or six feet or more, and the leaves are deeply cut into six or seven segments, being palmated or having the resemblance of a hand. It is also, probably, a native of the East, and has been brought from Istria.

There are several varieties with different colours, as in the former species: and a dwarf variety, with double, variegated flowers, has lately been in much esteem under the title of Chinese Hollyhock.

The third species has the stem suffruticose, four feet in height, upright, branched, and hispid. The leaves rough, alternate, petioled. The flowers of a scarlet colour, lateral, on a solitary, long, one-flowered peduncle. The pistil five-styled. The arils five, and smooth. It is a native of the eastern shore of Africa.

Culture.—The propagation of these plants is effected by seed in an easy manner. But in order to have them double, and of the best colours, as their varieties are by no means constant, the seed should always be selected from the best coloured and most double flowers, as in this mode most of the plants will produce flowers of the same kind, both in colour and fullness, if all such plants as afford only single or bad-coloured flowers have been carefully extirpated, and thus prevented from disseminating their farina, and causing them to degenerate. The seeds thus obtained should be preserved in their covers quite dry, in order to prevent their being injured by becoming mouldy, until the spring. They should then be sown upon a bed of good light earth

about the middle of April, covering them in to the depth of about half an inch. In performing this business, it is the practice with some to sow them thinly over the whole bed; while others, from the seeds being of a large size, prefer their being deposited in shallow, flat drills, made about six inches apart, and half an inch in depth. In these they should be sown in a thin and regular manner, bringing the mould back over them, and then raking the surface of the bed quite smooth. In this method the plants, from their coming up more closely together, will require to be transplanted at a more early period; but they may be covered better, and be kept clean in their early growth with more ease and facility. In either way the plants generally appear in the course of a few weeks. After the plants have put out six or eight leaves, as about the beginning of July, they should be transplanted into other beds, and set out to the distance of a foot or more each way, water being occasionally applied till they have taken fresh root. In these beds they may remain till the autumn, about the middle of October; care being taken to keep the ground clean from weeds; when they may be finally planted in the situations where they are to remain for flowering.

As the plants seldom produce any thing more than root-leaves the first year, it is the practice with some to suffer them to remain another year before the final planting out, in order that the goodness of the flowers may be ascertained. In this intention they should, however, be set out at much greater distances in the beds. The former is probably the best method, as young plants succeed with greater certainty than those of older growths; and where sufficient care has been taken in collecting the seed, there will be but few bad-flowered plants.

The Dwarf or Chinese kind, as well as the African species, may be raised from seed, either by sowing it upon a hot-bed or on a warm border, or in patches in the open ground, in the latter end of March or the beginning of April. The plants raised in the first and second method may be planted out about May or June, in places where they are to remain and flower. These mostly flower the same year, and should of course be raised annually from seed.

As most of these plants, though natives of warm countries, are hardy enough to thrive in the open air in this climate and are of tall growth, continuing to flower for a great length of time, they have long been considered as highly ornamental in the garden and pleasure ground, in the latter part of summer. Since they have become common, they have not however been regarded so much as they deserve, partly from their growing

too large for small situations, and their requiring tall stakes to secure them from being broken by winds. But in extensive grounds, where they are properly disposed, they make a fine show. As their spikes of flowers grow very long, there will be a succession of them on the same stems, often for more than two months; those on the lower part of the spike appearing first; and as the stalks advance, new flowers will be produced. When they are planted in good rich ground, their stalks often rise to a very great height, many feet of each being garnished with flowers, which when double, and of good colours, make a fine display, and produce a good effect; especially where the various colours are properly intermixed.

From the tallness of their growth in most of the sorts, they are best adapted to be placed towards the back parts of borders or clumps in shrubberies, lawns, courts, or other parts of pleasure grounds. Some of the Dwarf Chinese kind may, however, have occasionally a situation more towards the front in such places.

Though the roots of these plants are perennial, and send forth stems for many years in succession, they never flower with such vigour, or produce them of so large a size, so double, or of so good colours, as in the first two years. It is therefore necessary, in order to have good flowers of this sort, to raise some plants annually from good seed. This is the more easily effected, as all the species and varieties, both double and single, are very productive in seed for the purpose. From the plants being annual in their stem, they must be cut off and cleared away every autumn.

ALCHEMILLA, *Ladies' Mantle*, a genus comprehending several hardy herbaceous perennial plants of the ornamental kind.

It belongs to the class and order of *Tetrandria Monogynia*, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is a one-leaved, tubulous, permanent perianthium, with edge flat, divided into eight segments: no corolla: the stamina have erect, awl-shaped, very small filaments on the edge of the calyx, the antheræ roundish: the pistillum has an ovate germ; style filiform, of the length of the stamina, inserted at the base of the germ: stigma globular: no pericarpium, the neck of the calyx closing and never opening: the seeds are solitary, elliptic, and compressed.

The species mostly cultivated are; 1. *A. vulgaris*, Common Alchemilla; 2. *A. Alpina*, Alpine Digitate Alchemilla.

In the first of these the stems are prostrate, filiform, branched, and a little hairy. The root-leaves roundish, and plaited; the stem-leaves three- or five lobed. The stipules opposite, ovate,

and toothed. The divisions of the calyx are alternately larger and smaller. The under surface of the leaves is hairy; the radical ones resting on long hairy peduncles; the stem-leaves sessile, of a roundish form, divided into seven or eight lobes scalloped round the edges. The flowers form a kind of umbel, the universal involucre being a leaf which entirely surrounds the stem, but the partial involucre goes only half way round. The mouth of the calyx is closed by a yellow fleshy ring, which perhaps answers the purpose of a nectary. The anthers and stigma turn black after flowering. The seed is generally but one; sometimes however there are two in each seed-vessel. The chief beauty of this plant consists in the leaves; and when cultivated in the garden it grows much larger than in its natural situation. It is a native of the northern parts of the island. It takes its name from the scallop in its leaves, which have some resemblance to the ladies' scalloped mantles.

In the second species the leaves are very white, and consist of from five to nine folioles, but mostly seven, shining underneath, and serrated only at the ends; the stem-leaves having only three folioles. The flower-stems seldom rise more than six inches in height. It is admitted into gardens for the sake of its elegance. It grows naturally on the mountains in the northern parts of the kingdom.

Culture.—These plants are capable of being raised either by parting the roots or by sowing the seeds. In the first method the best season for performing the business is in the autumn, in order that the plants may be well rooted before the weather becomes too dry in the spring. The soils that are most adapted to their growth, when cultivated in the more southern districts, are those that incline to moisture, and where the situations are shady. In dry exposed places they do not thrive in any perfect manner. Where the latter method is practised, the seeds should be sown in the autumn upon borders of good earth that are shady and moist. After the plants appear, the only culture they require is that of keeping them clean and free from weeds.

They are low, hardy plants, which are perennial in root, but in leaf and stem only annual. The principal merit they possess as ornamental plants, is in the singularity of their leaves, which serve to afford variety when blended with other low-growing plants in the interior parts of borders, clumps, and other compartments in pleasure-grounds.

ALDER TREE. See *BETULA*.

ALDER, Black. See *RHAMNUS*.

ALETRIS, Guinea Aloe, a genus compris-

ing plants of the succulent, herbaceous, ever-green, exotic kinds, which belong to the *Aloc* tribe.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters of which are: that it has no calyx: the corolla is one-petalled, ovate-oblong, hexangular, funnel-shaped, semisexfid, very much wrinkled, the divisions, being lanceolate, acuminate, spreading, erect and permanent: the stamina are awl-shaped filaments, the length of the corolla, and inserted into the base of the divisions: the antheræ are oblong and erect: the pistillum is an ovate germ; the style subulate, the length of the stamina; the stigma trifid: the pericarpium is an ovate, three-cornered, acuminate, three-celled capsule: the seeds are numerous.

The species chiefly cultivated are the following:

1. *A. farinosa*, American Aletris; 2. *A. Capensis*, Waved-leaved Cape Aletris; 3. *A. Uvaria*, Great Orange-flowered Aletris; 4. *A. Hyacinthoides*, Hyacinth-flowered Guinea Aletris; 5. *A. fragrans*, Sweet-scented Aletris.

The first of these species has a tuberous root, from which arise several lanceolate leaves, and a naked stalk supporting a spike of flowers placed alternately, of a greenish white colour. The species appear in June, but are rarely succeeded by seeds in this climate. It grows naturally in North America.

In the second the bulb is tunicated, and of a violet colour. The root-leaves six, spotted with violet. The spike or raceme terminating, imbricated with great abundance of flowers, on very short peduncles; the bracte to each setaceous. The corolla subcylindrical, with flesh-coloured dots, and a very short obtuse border: the filaments adhering to it as far as the very edge. The germ is shut up in the bottom of the corolla, and the style is incurvated: the stigma being obtuse. The capsule is a little inflated, acutely keeled, compressed at the corners, and large. It is a native of the Cape of Good Hope, and flowers in this climate from November to April.

The third species, which is commonly known by the title of *Iris Uvaria*, has very long, narrow, triangular leaves, shaped like those of the bullrush; the flowers being produced in close thick spikes, upon stalks nearly three feet in height. They are of an orange colour: consequently, when the plants are strong, and produce large spikes, they make a fine appearance, and have a good effect. It flowers in August and September.

There is a variety of this with narrower leaves, and longer spikes of flowers, that has much ef-

feet as an ornamental plant. It is a native of the Cape of Good Hope.

The fourth species, or Ceylon Aletris, has the first leaves lanceolate, flat, erect, and short; the rest subulate, semicylindrical, channelled, and very long. It has fleshy, creeping roots, which multiply greatly, and seldom rises more than six inches in height.

But in the Guinea Aletris all the leaves are lanceolate, flat, and erect. They are in both of a pale green colour, with bands of a darker green; and do not appear to be specifically different. It has thick fleshy roots, like those of the flag, creeping far where they have room. The leaves come singly from the root; are near a foot and a half long, stiff, waved, proceeding immediately from the root, as also the flower-stems; which when the roots are strong are often a foot and a half in height, adorned almost the whole length with flowers of a clear white, but which seldom continue in beauty more than two or three days, and never produce seeds in this climate. It is often known by the title of Guinea Aloe.

The fifth species rises with an herbaceous stalk to the height of eight or ten feet, having many joints, and is adorned toward the top with a head of leaves, which are of a deep green colour, and reflex at their ends, embracing the stalks with their base. The flower-stems arise from the centre of the heads, and are generally two feet in height, branching out on each side, being fully garnished with white flowers, in shape somewhat like those of the second sort; but these open only in the evening, when they emit a most fragrant odour, closing again in the morning, and are not of long duration. They are however sometimes succeeded by seeds, but which are seldom capable of producing plants.

The roots in all the different species are thick, fleshy, fibrous and creeping; and from their manner of growth some of the sorts have been denominated *Aloes*.

Culture.—The propagation of these plants may be effected either by suckers and offsets from the roots, or by seeds; but as the last seldom ripen sufficiently in this climate, the former is the most general method in most of the sorts. As the first two species send off shoots very sparingly, they are raised with more difficulty than the last two, which afford heads from their creeping roots, and the sides of the stems, in a much more abundant manner. The third kind is mostly raised from seed, which it affords in great plenty.

In the propagation of these plants by the first method, the offsets, side-shoots, or heads, should

be taken off in the summer months, and be planted out in small pots of good light sandy earth, which must then be placed in a moderate bark hot-bed. In the last sort, the side heads, after being taken from the stems, should be placed in the stove for several days, that their wounds may be healed before they are planted in the pots.

In the second mode, or that of raising the plants from seed, they should be sown in pots immediately after they become perfectly ripe, and be protected during the ensuing winter by a good hot-bed frame and lights. When the plants appear in the spring they should be gradually inured to the action of the open air; and after they are become of a sufficient size, some of them may be planted out in warm borders in dry light soils: but as they are very liable to be destroyed in severe winters, a few plants should always be put in pots, in order to preserve the kind, by being protected under glasses in sharp seasons. The third sort is the best propagated in this way.

The after-management that is necessary is different in the different kinds.

The first sort, though tolerably hardy, requires the protection of a hot-bed frame during the winter, in order to preserve it. As the roots in this sort increase very slowly, and the seeds seldom become sufficiently ripened in this climate to produce plants, they are very seldom met with.

The pots in the second sort should be sheltered in a dry airy covering of glass, in winter, as the plants are too tender to thrive in the open air in this country: they should be removed into this situation in October, being sparingly watered during the winter season. About May they may be placed abroad in a sheltered situation, and in warm weather be frequently refreshed with water. In this management the plants often flower; but as they seldom perfect their seeds here, or increase much by roots, they are very scarce. As in the third sort the plants will seldom have acquired sufficient vigour or hardiness in the first season to bear the effects of cold, they should receive the protection of glasses in the second winter as well as the first.

The fourth and fifth kinds of Aletris are too tender to live through the winter in this climate, unless placed in warm stoves; and do not produce flowers if the plants be not plunged into tan-beds; for though they may be preserved in dry stoves they make but little progress. In a tan-bed they always advance faster; the leaves are much larger, and the whole plant considerably stronger. The Guinea Aletris sometimes flowers in a dry stove; but the flower-stems are

mostly weak, and do not produce half the number of flowers as when in tan; but the Fragrant Aletris has not yet flowered when kept in the dry stove in this climate. These should not be set out in the open air, even in the summer months.

The fifth sort will likewise require the same sort of management, as being constantly under the protection of the stove.

The more hardy sorts are highly ornamental in borders, clumps, and other compartments about the house; and those of the more tender kinds afford a pleasing variety in the stove and greenhouse.

ALEXANDRIAN LAUREL. See *Ruscus*.

ALKANET. See *ANCHUSA*.

ALLEY, a narrow path, formed by treading the mould down with the feet, between beds, borders, and other parts in gardens, for the convenience of performing different operations in the cultivation of the plants that grow upon them; and in gathering the different kinds of produce. They should be made of different breadths, according to the extent of ground, and the nature of the vegetables that are to be grown upon them. Where the beds are extensive, and the plants upon them of tall growth, or where manure, water, and other materials are to be conveyed along them, they should seldom have less breadth than from two to two feet and a half. The cross alleys, that divide and separate different large compartments, should likewise have the same dimensions. Between beds of asparagus, they should never be less than two feet; but for strawberries and different sorts of plants of the herbaceous aromatic kinds, a foot and a half may be fully sufficient. In dividing the smaller sorts of beds, such as those of onions, leeks, carrots, parsnips, beet, spinach, endive, lettuce, and other similar crops, one foot will in general be fully sufficient: and for different crops of the seedling description, such as those of the cabbage, cauliflower, brocoli, celery, and other sorts of the same nature, ten inches may afford space enough for the purpose of performing the operations of pricking them out, weeding, watering, and drawing such as are in a state to be transplanted.

In flower-gardens, courts, and other places about the house, alleys are frequently designed for the purpose of producing an ornamental effect, as well as for the convenience of cultivating and managing the flowers: in these cases they should never have less breadth than two feet, and be made with the finest and best coloured gravel, sand, or other materials, and the beds be previously edged with box, thrift, or some other

plant proper for the use. The beds of pinks, crocuses, tulips, hyacinths, ranunculuses, anemones, and other flowers of the more beautiful kinds, may be separated from each other in this way.

ALLIGATOR PEAR. See *LAURUS*.

ALLIUM, a genus comprehending Garlick, Onion, and Leek, which are mostly bulbous-rooted plants, cultivated for culinary uses.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters of which are: that the calyx is a common spatha or sheath; roundish, shrivelling, and many-flowered: the corolla consists of six oblong petals: the stamina have six filaments, subulate, generally of the length of the corolla: the anthers are oblong and upright: the pistillum has a germ superior, short, bluntly three-cornered, the corners being marked with a grooved line: style simple, stigma acute: the pericarpium is a capsule, very short, broad, three-lobed, three-celled, and three-valved; and the seeds are many and roundish.

In the Garlick kind the species are extremely numerous; but those that are chiefly cultivated for domestic uses, or the purpose of ornament, are: 1. *A. sativum*, Common Garlick; 2. *A. Scorodoprasum*, Rocambole; 3. *A. Moly*, Common Yellow Moly; 4. *A. subhirsutum*, Hairy White Moly; 5. *A. sphaerocephalon*, Spherical-headed Purple Moly; 6. *A. roseum*, Rose-coloured Montpellier Garlick; 7. *A. flavum*, Straw-coloured Pendulous Moly; 8. *A. magicum*, Great Purple Moly; 9. *A. victorialis*, Elliptical Garlick; 10. *A. descendens*, Oval Purple-headed Garlick.

The first species, or Common Garlick, has many bulbs, commonly called cloves, invested with a white skin: the leaves are linear, long, and narrow, like those of grass. It is said to be found wild in the island of Sicily.

The second sort, or Rocambole, has compound bulbs; but the cloves are smaller than those of Common Garlick. The stem rises from two to three feet high, and bears many small bulbs at top, which may be used as well as those of the root. The leaves are plane indented, every line having a two-edged vagina. It is found wild in Sweden.

The third species has the three outer petals spreading, the inner ones erect. It was formerly much preserved in gardens for the sake of its yellow flowers; but having a very strong garlick scent, it has not been lately so much cultivated. It is a native of Hungary.

The fourth has the bulb the size of a hazel nut: the stem a foot or eighteen inches high, round, smooth, and solid: the lower leaves grassy, embracing the stalk, reclining a little on

the ground; those on the stem, broad, smooth, and keeled. The flowers in an umbel, of a white colour, and rather small. It is a native of Italy, and flowers in May.

In the fifth, the stems are glaucous, not streaked, smooth, and round; the leaves flat above, convex below, becoming semicylindrical and channelled, as long or longer than the stem: the spathes not tailed, one larger than the other, and bifid: the head of a short conical form: the peduncles lengthening towards the middle, and forming a close imbricate umbel: the petals red with a darker keel, permanent, and becoming more convergent, ovate, the outer ones shorter and narrower; not awned: the filaments purple towards the top: the style is purple within, very long, and the stigma yellowish: it bears capsules, and is a native of Italy.

The sixth has the leaves linear, scarcely so long as the scape, which is cylindric. The spathe is obtuse: the flowers larger than in any of the rest, and of a dark purple colour: the stamens white and very short. It grows naturally in the fields and olive-grounds about Montpellier and in Piedmont.

In the seventh, the stalk is leafy, round, and glaucous. The leaves round, not angular, flattish above the base: the sheath twice as long as the umbel, one valve leafy: the umbel with pendulous yellow pedicels: petals of a deep yellow colour, obtuse concave, and erect: the stamens simple, twice as long as the corolla: the style short. It is a native of the South of France.

The eighth has a weak, cylindric scape a foot high, the root-leaves being broad, channelled, and obtuse. It is cultivated in the gardens for the sake of variety.

In the ninth species, the wild plant has the root-leaves half an inch broad; but when transplanted into the garden, the leaves grow to four inches in breadth, without becoming much longer. The stem is from a foot to eighteen inches in height. The petals are of a dirty white colour, with a tincture of green. It grows on the mountains of Switzerland.

The tenth has two bulbs at the origin of the stem or stalk: the leaves are fistulous and channelled above: the stalk rises to two feet in height: the sheath is quadrid. It is a native of Italy, &c.

Except the two first, most of the sorts are of the flowering kind, having bulbous roots of different sizes; some large, others not bigger than peas. They are perennial in root, but annual in leaf and stalk, and are all hardy, prospering in almost any exposure and soil, being in general very productive. Most of the sorts have a strong scent, like that of common garlic, which

renders them much less valuable as ornamental plants.

In the Common Garlic, each of the small bulbs or cloves, on being planted, grows, and in one season attains the size and structure of the parent bulb. The leaves form a kind of stalk, which seldom spindles, except when the same roots remain in the ground two or three years; in which case they run up and bear a flower, and small bulbs at top. It is mostly cultivated in the garden for the sake of its root, which is in great estimation for culinary and other domestic uses.

In the Rocambole the bulbs are very small, compound, growing in clusters; the stalk generally spindling two or three feet in height, with many bulbs at its summit, which, as well as the root-bulbs, are useful for the same purposes as garlic, though much inferior in quality.

In the flowery kinds, the flower-stems rise immediately from the root, growing erect and attaining different heights, from twelve to thirty inches. In some the leaves are radical; in others they are elevated with the stalk; some being broad like those of the tulip, others long and narrow like the daffodil, and some taper or rush-like: but in all the sorts the stems are terminated by a sort of sheath, from which is protruded an aggregate of many small flowers, forming a kind of umbel, which, from many being collected into large heads, are very conspicuous and showy.

In the Onion kind, the species for cultivation are: 1. *A. Cepa*, Common Onion; 2. *A. fistulosum*, Ciboule or Welsh Onion; 3. *A. Schanoprasum*, Cives or Chives; 4. *A. Ascalonicum*, Eschalot or Shallot; 5. *A. Canadense*, Canada Tree Onion.

The first species, or Common Onion, has a large bulbous root: the leaves are fistular and tapering, the flower-stem being naked, swelling out towards the bottom into a sort of belly.

It has several varieties; but those most commonly cultivated are: the Strassburgh or Common Round Onion,—the Oval Long-keeping Common Onion,—the Spanish Large Flat Onion,—the Spanish Silver-skinned Onion,—the Spanish Red-skinned Onion,—the Portugal Great Roundish Oval Onion,—and the Tripoli Onion.

The second species, or Welsh Onion, is a perennial plant, and does not form bulbs like the Common Onion. The leaves are upright, and swelling in their form.

In the third, the bulbs are long, flat, oval, very small, growing many together in small close bunches, being connected by rectilinear planes. Scapes fistulous, eight inches or a foot high: leaves fistulous, awl-shaped, rising in great

numbers into tufts. The spathe is short, two-leaved, white, ovate, with purple lines: a few large flowers in the umbel; these are erect, cylindrical, with petals acutely lanceolate, shining, faint purple with a darker line, in two ranks, joined at the base: stamens from the origin of the petals, with broad bottoms, connected with the petals and each other. The capsule is conical and obtuse. The smell is very strong. It is a native of Italy.

The fourth species is nearly of the same size as that above. The stem is almost naked, rising about seven inches in height. The spathe is membranaceous: the bulbs are formed in a close cluster: the leaves are small, slender, and awl-shaped: the flowers less than in the above species: the petals erect, ovate, lanceolate, of a blue colour with a dark keel: the stamina of the same length as the petals, alternately broader, with trifid tops: the antheræ of a yellow colour; the style with an obtuse stigma.

In the fifth, the roots are small, bulbous, and perennial: the stem upright, nearly naked, smooth, and cylindrical, having clusters of small bulbs of the onion form at the top: the spathe ovate, pointed, and sharpish: the leaves flat, smooth, and straight, about seven inches in length. The flowers are few, pedicelled, and of a whitish colour: the petals oval with simple filaments, the length of the corolla; the antheræ being of a brownish red. It is a native of North America.

In the first of these species and varieties the roots are large and bulbous, the plants being biennial, as on being sown in the spring they arrive at perfection in the root the same year, and next year shoot up into stalk, flower, and ripen seed; when the stem quickly dies, and the individual is destroyed.

But in the second they never form any bulbs at bottom; and in the third they are very small, the plants being hardy and perennial, being capable of being continued many years by the roots.

The fourth and fifth species are bulbous-rooted perennials, which multiply greatly by offsets.

In the Leek kind there is only one species, which is the *A. Parrum*, Common Leek.

It has an oblong truncated root: the stem or scape is three feet high or more, and leafy at the bottom. The leaves are an inch wide, with the edges smooth or cauline: the spathe shortly conical, deciduous: the flowers in a close, very large ball, or head, on purple peduncles: the corolla is also purplish. It flowers in April and May.

There are several varieties in cultivation:—as the Broad-leaved or London Leek,—the Narrow-leaved Leek,—the Striped-leaved Leek.

The first of these varieties is the best for general culture, as it attains a large growth, the neck

acquiring a thick fleshy substance; in length from six to nine or ten inches, dividing upward into many large, long, thick leaves, that arrange themselves in a sort of fan-form.

The second sort runs up with a long thin neck, and narrow thin straggling leaves, which is an inferior variety that seldom deserves culture: and the Striped-leaved kind is only grown for variety. It may be continued by the suckers that rise from the old roots.

The Leek may with propriety be said to be an annual and biennial plant; for, although the roots often survive, after perfecting seed, the plants always attain perfection the same year they are sown, and the year afterwards run up to stalk, and become unfit for use. The seed-stalk in this plant does not belly, as in that of the onion.

Culture in the Garlick kind.—The propagation in all the sorts may be effected with great facility by means of offsets from the roots, and in many of them by seed, and the small bulbs contained on the stalks. Common Garlick is constantly propagated by the small bulbs that constitute the main root, which may be readily divided into a great number of separate cloves. These are to be planted in the spring, in beds four feet wide, a little raised in rows lengthways, at from six to nine inches distance from each other, six inches asunder in each row, and two or three inches in depth. The planting may be performed either by means of a blunt dibble or by drawing drills, and placing the cloves in them, afterwards covering them with the earth. When planted in this way they mostly shoot up their leaves in a month or six weeks, requiring only occasional small-hoeing afterwards, to keep the plants clean from weeds. In the beginning of June the leaves should be tied in knots, in order to prevent their spindling, and enlarge the bulbs.

About the end of July or beginning of August the bulbs are generally full grown, as is evident from the yellow appearance and the withering of the leaves: they must then be taken up, cleaned, and dried in the sun, and afterwards tied or plaited in bunches to be hung up and preserved for domestic use.

Rocambole may be propagated either by the offsets of its roots or by the cloves produced on the tops of the stalks, which may be planted in spring or autumn; but in the autumn planting, as about October or November, they generally grow considerably larger than when planted in the spring season.

The sets are to be planted in the manner directed for Garlick, and are commonly fit for use about July or August, according as they have been put in early or late. But roots of this sort never acquire any very large size.

The different flowering kinds may be propagated very readily by offsets, which may be separated any time after the decay of the flowers, taking only such as are large and fine, planting them at once in the borders or other places where they are to remain, and where they will flower in the following summer.

When the plants are propagated by seed, the best method of accomplishing it is in a shady border in the spring, the plants being ready for transplanting in such cases in the autumn following. Some of the sorts may be employed in the way of ornament, and for the purpose of variety in extensive gardens and pleasure grounds. For this use the three last species will be the most proper, though several of the others may sometimes be had recourse to.

Culture in the Onion kind.—In all these kinds the propagation is effected by seed, which should be sown annually at different times, according to the season at which the crop is wanted; but for the general crop it should always be performed from about the twentieth of January until the beginning of March, though in cold wet stiff soils it may be proper to defer sowing entirely until towards the middle of the last of these months. About the middle of February may however in general be the most proper, from the season being more favourable to the vegetation of small seeds. In case the sowing has been omitted at the times recommended above, it may often be performed with tolerable success in the beginning, or any time before the middle of April; but the crops of the February or March sowing always bulb more freely, and acquire a much larger growth than those sown at later periods.

The most suitable situation for crops of this kind is an open exposure, where the soil is of the loamy kind; moderately light, mellow, and rich, in good vegetable mould. Thus, spots of the best and most mellow ground in the garden should always be chosen; and if possible a good coat of well rotted dung or compost be dug well in, but not to too great a depth, the surface being kept level, and, while it is fresh stirred, well raked, and the seed sown upon it. This is a point which is of much importance to be attended to. The sowing should not however be performed when the surface is so wet or moist as to clog to the feet or rake in preparing it. The proper quantity of seed is in general about an ounce to every rod or pole of ground; but where it is not required to have them thick for cullings, two ounces for three rods may be fully sufficient, as the plants are much weakened and drawn up by standing too thick. Great care should constantly be taken to procure fresh seed, as but very little of that which is kept more

than one year will vegetate. It is always the best method for the cultivator to save it himself. The seed may either be sown over the whole of the piece or plat of ground, or it may first be divided into beds of four, five, or six feet in width, allowing foot-wide alleys between them. In sowing in the broad-cast method, the seed should be dispersed over the ground with a regular spreading cast, it being a practice with some to tread the surface over immediately afterwards evenly upon the seed. This however is improper, except where the soil is very light. Where sown in beds, the alleys may be afterwards pared an inch or two deep, and the earth cast over them, directly raking them regularly with an even hand, trimming off all the stones, roots, &c. They may also be sown with success in drills, at the distance of eight or twelve inches. See *SOWING SEEDS*.

But the method of sowing them in beds is the most eligible, where it is designed to draw young onions from time to time for market or family use; as in such cases a person can stand in the alleys without treading upon the beds; which not only renders the surface hard, so as to injure the crop, but is highly detrimental, by trampling upon the plants themselves. They likewise afford much convenience for standing in the alleys, in order to weed, thin, and hoe the crops.

Although it is a common practice in the general culture of onions to sow them thick, in order to allow for drawing out the superabundant plants by degrees as they are wanted, it would certainly be a better mode to sow a piece particularly for general culling, exclusive of the main crop, as by daily thinning out the superfluous plants there is no avoiding treading upon, bruising, disturbing, and loosening the remaining ones, by which they become stunted in their growth, and by no means so fine.

There is also another very common but injudicious practice, which is that of mixing other crops, such as those of the leek, lettuce, radish, and carrot kind, with these crops. This is productive of much inconvenience and obstruction to the chief crop, without producing any great advantage: nothing should therefore be admitted except a very thin sprinkling of coss-lettuce in some cases.

In about a fortnight or three weeks after the seed is sown, the plants generally appear, and in a month after that, as in May and the beginning of June, they will be three or four inches high; when they should be well cleaned from weeds, and the main crop thinned to three or four inches distance. The weeding and thinning should be begun in due time, when the weather is dry, before the weeds branch out and spread much; which may either be performed by the hand or a small hoe: the latter is the more expeditious

method, as by it one man may do as much as three: and it is also the most beneficial to the plants, as, by stirring the ground about them with the hoe, it greatly forwards their growth, as is mostly seen in a few days after the operation has been executed. This mode is more particularly eligible for the larger principal crops, for which a good sharp one-hand hoe, about two inches or not more than two and a half broad, is the best, carefully cutting up all sorts of weeds. Where the onions stand too close they should be cut out in a regular thinning order to about three inches distance in the first hoeing; and in the second, which should be done a month or five weeks after the first, in such crops as are not wanted for occasional drawing, they may be hoed out to four or five inches, or more, leaving the strongest plants as much as possible for the continuing crop. Where the beds are very clean, the plants may be set out at the first hoeing to these distances. It is of much consequence to the crops that the plants have plenty of room. It will generally be proper to run over them again in the same manner a few weeks afterwards, in order to cut up all advancing weeds, and any superabundant plants that may have escaped in the former operations; after which they seldom require any further culture than that of pulling out such casual straggling weeds as may present themselves.

Where the crops are small, or where they are required for thinning or drawing by degrees, for use in their young green state and in small bulbs, the weeding and thinning, where in clusters, may generally be best performed by the hand.

In the more advanced growth of the crop, where the superabundant plants are occasionally thinned out for use as wanted, they should be drawn in a regular manner, so as to leave a sufficiency of the strongest plants remaining at moderate distances for a crop to attain their full growth.

It is highly necessary to continue to keep the crops very clean from weeds in their advancing growth during the months of May, June, and July; which begin their principal growing season, if they are not kept quite free from weeds, and sufficiently thinned, they draw up weak and slender, by which their bulbing is much retarded. About the middle or latter end of June the crops begin swelling a little at bottom, but more fully in July; and in August the bulbs arrive to full growth, and are proper for taking wholly up. But about a fortnight, three weeks, or more, before this time, when they begin to bulb, the stems should all be broken down or *laid*, which is most readily performed by two persons passing a small pole or rod along the beds, so as to strike

the necks of the onions about four inches from the bulbs. Some, however, twist the necks by the hand; which effects the business more effectually. The nourishment of the plants being in this way diverted from the stem, tends to promote the swelling of the bulbs.

Towards the middle of August the crops must be examined; and when the necks shrink and fall, and the leaves wither, it may be concluded that the bulbs are arrived at maturity and have done growing. They should then be pulled up, cleaned, and dried; which is best done in dry weather, on a piece of ground raked and cleaned, in order to spread them upon, to dry and harden as they are pulled up. They should lie in this way a week or more, being turned every day or two; after which the first opportunity should be taken to house them. The bulbs must be first divested of all adhering earth, loose skins, and the grossest part of the leaves and neck, rejecting all the bad and bruised ones; and then they may be deposited in any dry upper room, out of the damp, spreading them thinly on the floor. The closer the room in which they are kept, the better; but care must be taken to turn them over occasionally, and to clear out such as have any tendency to become putrid.

As in the culture of onions it frequently happens, that through badness of seed, or other causes, persons are disappointed of a crop, by waiting, in expectation of the plants coming up, till it becomes too late to sow again; in such cases, recourse may be had to the practice of transplanting from other beds or gardens where there are superfluous crops. This business is best done in May, or early in June, and, if possible, in moist weather: having a spot of well dunged ground prepared, the plants should be taken up with good roots, and immediately planted in rows six inches distant, and four inches apart in each row, inserting the roots but a little way into the ground; for, if planted deep, they do not bulb well. A good watering should be given as soon as the plants are put in. By repeating the waterings occasionally for a week or fortnight afterwards, the plants will generally grow freely, and form tolerably handsome bulbs. It is probable that this method might sometimes be adopted in the more early crops with advantage in respect to the size of the bulbs, as it is generally employed in Portugal where the culture of these crops is carried to much perfection.

Onions for pickling are in great request in many places: those proper for this purpose should not be bigger than common round bettons. In order to procure them of this size in due quantity, some seed should be sown late, in a spot of light poor land: about the middle of

April is probably the best time. It should be sown rather thick; the plants requiring little thinning, except where they rise in thick clusters. They bulb in June and July, and are generally fit to take up in August.

Among the several varieties of the common onion, the Strasburgh is the most proper for general culture, having a handsome bulb, mostly of a roundish-oval shape. It is of firm growth, and generally keeps well for winter use. The Spanish onion is large and flat, but of mild flavour; all the varieties affording profitable crops, and can scarcely be excelled for culinary purposes; but they seldom keep so well after Christmas as the Strasburgh kind. The Portugal onion has a very large handsome bulb of a roundish-oval shape, though it rarely attains the size here as in that climate; but from its being mild it is held in much esteem for sauces and other culinary uses. The Tripoli is also a mild onion; but all the kinds degenerate by long culture.

In the spring, some of the keeping onions unavoidably grow as they lie in the house: these may be planted out in rows six inches distant, and will serve to draw up by way of *Escallions* early in the spring. But the true Scallion may be easily propagated by parting the roots, either in spring or autumn; but the latter season is preferable, on account of their being more fit for use in the spring; these roots should be planted three or four in a hole, at about six inches distance every way, in beds or borders three feet wide, which in a short time multiply much. They will grow upon almost any soil, and in any situation; and from their being so hardy as to resist the severity of winter, and being green, and fit for use early in the spring, they deserve to be cultivated.

Besides the principal crop of onions there is an autumn or Michaelmas crop, which is generally sown in August: the plants appearing before Michaelmas stand the winter, to draw occasionally for use in that season, but principally for spring use, in sallads, &c.: and likewise where the Strasburgh or other variety of the common onion is sown, if permitted to stand, they bulb to a tolerable size in June, and supply the kitchen or market as headed onions till those of the spring crop are ready.

The above is the best season for sowing these crops, as, if sown sooner, they are not only apt to get too forward in growth before winter, but to run up to seed earlier in the spring: therefore the proper time for the main crop is the first or second week of that month, and in the third for a late-standing one; which should be in beds four feet wide, with alleys a foot in width between them, raking the seed as in the spring crop, only

using a much larger quantity of seed in this case. The plants generally appear in a fortnight, as well as many weeds, which must be cleaned out by hand before they begin to spread much, the plants remaining without being thinned now: but in November and the following month, if they stand very thick, some of the largest may be occasionally thinned out for use.

For the saving of seed, February is the proper time to plant the old roots, though this is often done in October by those who have occasion for great quantities for sale. For this view, choose a quantity of the largest and handsomest bulbs which have not made any effort to grow, and upon a spot of ground properly dug, and well exposed to the sun, plant out the onions in two or three drills, formed by a line with a hoe or spade, twelve inches asunder, six in depth, and nine inches distant, raking the earth over them; then measuring off two feet for an alley, plant two or three more rows in the same manner, and in that way proceed till a sufficient extent of ground is planted: the wide spaces serve to go between in, to hoe and clear off weeds, as well as to stake and support the stalks of the plants when necessary. In June the flower-stalks will be shot to their full height, and the flower-heads be formed at top; to secure which in an erect position, some stout stakes should be fixed in the ground along each row at two yards distance, fastening from stake to stake double lines of packthread; which being tied together in the intervals between the stems of the plants, effectually secures them. About the latter end of August the seed will be ripe; which is known by the capsules opening, and the black colour of the seed. The heads should then be cut in a dry day, and spread upon cloth in the sun, taking care to remove them under cover in case of wetness and at night; and when perfectly dried the seed should be rubbed out, cleaned from the rubbish, and put up in bags for use. As it is of the utmost importance to have good fresh seed, in order to try its goodness some sow a little in a pot, and place it in a moderate hot-bed or near a fire; but a more expeditious method is, to tie a little of the seed loosely in a piece of linen rag, and put it into hot water suspended by a thread, and in ten or fifteen minutes pull it out; and if the seeds are good, they will in that time have germinated, or sprouted out to some extent.

The second species, the Ciboule or Welsh Onion, as it never forms any bulb at bottom, is cultivated only to draw as young green onions for sallads, &c. in spring, but on account of its strong taste is greatly inferior to those of the Common Onion. From the plants being so extremely hardy as to survive the severest winter,

in which though their blades be cut off, the roots remain sound, and shoot forth with great vigour early in spring, furnishing seasonable supplies till May, when they generally run to seed. They may be cultivated more or less as a winter-standing crop, with advantage for spring use. It is perennial in root, and increases by offsets into great clusters, but is not propagated in that way for general use, but by seed in the same manner as the former sorts of onion. The best season for sowing the seed is in August, in the same manner as the autumn onion crops.

The plants mostly appear in twelve or fifteen days after being sown, and towards Michaelmas should be carefully hand-weeded. It is a peculiarity, in this species of onion, to lose its top in November or December, and remain in that state till towards Candlemas, when the roots shoot forth again; at which time it is proper to dig the alleys, and spread about an inch depth of the earth evenly over the surface of the beds; by which vigour is given to the roots, and the plants are made to rise strong, and at the same time the part within the earth blanched white, and rendered more tender and mild to eat, as well as more agreeable.

When the sowing of a Michaelmas crop has been omitted, some seed may be sown towards the end of January, in which case the plants will appear in February or March; and being hardy continue growing, and become fit to draw in the early spring months. In order to save a supply of seed of this species of onion, it is necessary to retain some plants for stools. In the end of March, a parcel of strong young plants may be put out nine inches distant, which will produce seed in August. But if the roots be let remain, in the following year, they produce treble the quantity: but as they increase into great bunches, the stools should be removed and separated every second or third year at the furthest.

The third species, the Cives or Chives, is the smallest of all the onion kind, rising but a few inches high: it is perennial, and increases considerably into clusters, from which large tufts of slender awl-shaped leaves issue, which are the principal part used, the roots never forming any bulbs, at least not bigger than small peas. It is a hardy plant, which deserves a place in every kitchen garden; as its clusters of leaves appear early in the spring, and are useful in sallads, and for other ordinary purposes, before the onion is ready.

The chief method of gathering it is by cutting the leaves off near the ground, by which a fresh supply is soon produced from the bottom; or occasionally the plants may be slipped quite to the root of the clusters, in separate little plants, which resemble young onions, and may be used as substitutes for them. It is easily increased by

dividing the roots in spring, and planting eight or ten of them together in holes, at six inches distance, on the edges of beds or borders. In this way, by the autumn they multiply into bunches of a large size.

The fourth species, the Eschalot or Shallot, is a kind of onion, which is bulbous-rooted, and which increases greatly by offsets, the largest of which are the proper parts of the plant for use. The bulbs are oblong, irregular, and seldom grow to any great size; for, as they generally increase into clusters, they do not swell like roots that grow singly. From the roots are produced many long narrow feeble leaves in the spring, which wither in July or August, when the roots are full grown. They should then be taken up, made dry, and housed; in which way they keep in good perfection till the following spring.

The propagation of this plant is best performed by the smaller roots or offsets, which may be planted out in autumn or early in the spring. The end of October, or beginning of November, is the most proper season for the autumn planting, and February and March for that of the spring, but not later than the beginning of April. The spring is the most general season of planting them; but when this is done in autumn, in a dry light soil, they often grow larger, and sooner attain their full growth the following summer. They should be planted in beds of good light earth, four feet wide, in rows lengthways of the bed, six inches asunder; each offset being inserted singly, either by means of a dibble, or planted in drills, not more than two or three inches deep, and the same distance as above in each row. They mostly shoot up in leaves in March or April, and the roots increase in growth till July or August. The only culture which they require afterwards, is that of keeping them clean from weeds, by occasional hand-weeding or hoeing. Towards the end of July or beginning of August, the bulbs will have attained their full growth, as is seen by the withering of the leaves. They should then be taken up in a dry day, and spread in the sun to harden; when the largest should be cleaned and housed for use, and the smaller offsets reserved for propagation in the spring.

Shallots being sometimes wanted early in the summer; in such cases, as they will have formed small bulbs towards the latter end of May or in June, a few may occasionally be taken up for a present supply, permitting a principal crop to remain in order to effect their full growth.

The fifth species, the Canada or Tree Onion, is cultivated both as a curiosity in producing the onion at the top of the stalk, and for the use of the onions for the purpose of pickling, in which they are excellent, being much superior in flavour to the common onion.

It is propagated by planting the bulbs either in spring or the autumn, the root-bulbs, or those produced on the top of the stalk, being proper for the purpose. They should be set in a bed of good earth, in rows a foot asunder, six inches distant in each row, and two or three inches in depth; in which case they will shoot up leaves and stalks in the spring and summer, and produce the bulbs for use in July or August; and the root-bulb remaining afford a production of top-bulbs annually in that season. The root-bulb increasing by offsets may be taken up occasionally at the time the stem decays in autumn, or once in two or three years, in order to separate the offsets, and replant them when necessary.

Culture in the Leek kind.—The Common Leek is raised annually from seed sown in the spring; the proper time for the general crop, for autumn and winter use, is the same as that recommended for the onion, as from the middle of February to the end of March; but for later crops to stand for spring use, any time in April may answer; or for a small crop to stand as late in the following spring as possible, without running to seed, the beginning of May may be the most proper.

It is a common practice, from the notion of making the most of the ground, to sow leeks along with crops of onions; but which should not by any means be recommended, as experience has shown it to be considerably the best culture to keep them separate. It is mostly done by the market gardeners, when intending to draw out the onions from time to time for market; so that, by a daily thinning, they are commonly all cleared off by the end of July, when the ground remains occupied by a crop of leeks.

The best culture for the general crops of leeks is to sow them pretty thick in a spot by themselves, to be afterwards transplanted, either wholly, or the greater part thinned out regularly and replanted, the others being left at good distances for full growth. For this purpose the same situation, soil, and method of sowing, is to be made use of as for the onion. In June, July, and August, the plants will be of a proper size for transplanting; in doing which an open spot of the best ground should be chosen, and dunged well by digging it in one spade deep, afterwards drawing a parcel of the largest plants, and trimming their tops and the extreme parts of their root-fibres, planting them by the line and dibble in rows, which for the early crops should be twelve inches distant, and eight or nine inches apart in each row; and for later crops nine inches between the rows and six the other way, putting them three or four inches in the ground, or nearly to the length of their necks, watering them immediately after the work has been performed.

The only culture they require afterwards is to

be kept clean from weeds, which may be done either by hand-weeding, or more expeditiously by applying a sharp hoe in a dry season. Leeks thus cultivated are generally finer than those that remain where sown; their necks, which are the principal esculent parts, being much longer, and all the parts within the earth finely whitened, and rendered mild and tender; which are desirable properties in this plant. However, when it is intended to raise a crop of leeks in good perfection, to remain where sown till their full growth, the seed should be sown much thinner; and when the plants are somewhat advanced, as in June or July, they should be regularly thinned to about ten or twelve inches distance. Those thinned out being planted out separately, the remaining plants will by this means attain a larger and thicker growth below, with large spreading tops of thick fleshy leaves. This is a valuable family plant from autumn till spring, for soups, broth, &c. and for boiling the neck part and top leaves together, to use as greens, in the manner of coleworts, &c. It is in perfection from September till May, when it shoots up to stalk for seeding.

In order to save the seed of this plant, a quantity of the finest plants should be transplanted in February, into a sheltered sunny bed, or under a south wall, paling, hedge, or other fence. This is necessary, as the seeds ripen late in the autumn, and, unless assisted by such situation and shelter, seldom become fully ripened in this climate. In June, when they have shot up and formed their stems, they should be supported and continued in an upright growth. And in July the flowers protrude from their sheath at the summit of each stalk, and form large globular heads, the seeds beginning to ripen in September, which, after they have come to perfect maturity, should be cut off, tied up in bunches, and hung up till perfectly dry; when the seed should be rubbed out, and put by in a dry situation till it is wanted for use.

ALLSPICE. See MYRTUS.

ALMOND, *African*. See BRABEUM.

ALMOND, *Dwarf*. See AMYGDALUS.

ALMOND-TREE. See AMYGDALUS.

ALNIFOLIA. See CLETHRA.

ALNUS. See BETULA.

ALOE, a genus comprehending several perennial, evergreen, succulent, highly ornamental plants of the African Aloe kind, and mostly of the tender exotic sort.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters of which are: that it has no calyx: the corolla is one-petalled, erect, sexfid, and oblong; the tube gibbous; the border spreading and small; nectareous at the bottom; the

stamens haveawl-shaped filaments, as long as the corolla, or longer, inserted into the receptacle; the antheræ oblong and incumbent: the pistillum is an ovate germ; the style simple, of the length of the stamina; the stigma obtuse and trifid: the pericarpium is an oblong capsule, three-furrowed, three-celled, and three-valved; the seeds are several, and angular.

The species are very numerous, but those of the most curiosity and beauty are: 1. *A. dichotoma*, Smooth-stemmed Tree Aloe; 2. *A. perfoliata*, Perfoliate Aloe; 3. *A. arachnoides*, Cobweb Aloe; 4. *A. margaritifera*, Pearl Aloe; 5. *A. verrucosa*, Warted or Pearl-tongue Aloe; 6. *A. carinata*, Keel-leaved Aloe; 7. *A. maculata*, Spotted Aloe; 8. *A. Lingua*, Tongue Aloe; 9. *A. plicatilis*, Fan Aloe; 10. *A. variegata*, Partridge-breast Aloe; 11. *A. viscosa*, Upright Triangular Aloe; 12. *A. spiralis*, Spiral Aloe; 13. *A. retusa*, Cushion Aloe; 14. *A. spicata*, Spiked Aloe.

The first has the trunk round, upright, very stiff, ash-coloured, smooth, and of an extremely even surface, dichotomously branched at top, two fathoms in height, the thickness of a man's thigh. The branches are dichotomous, upright; a foot and more in length, leafy at top. The leaves are perfoliate, sword-shaped, and toothleted, convex beneath, flat above, from spreading becoming upright, smooth, fleshy, a foot long, the upper ones gradually smaller. It is a native of the Cape of Good Hope.

The second species grows to the height of ten or twelve feet, with a strong naked stem, the leaves growing at the top, and closely embracing the stem; they are about two inches broad at the base, growing narrower to a point, and are reflex, and indented on their edges, each being armed with a strong crooked spine. The leaves are of a sea-green colour, and very succulent. The flowers grow in pyramidal spikes, and are of a bright red colour. They are in beauty in November and December.

In the new edition of Miller's Dictionary, by professor Martyn, the Narrow-leaved Sword Aloe, or *Aloe arborescens*; the Broad-leaved Sword Aloe, or *Aloe Africana*; the Barbadoes Aloe, or *Aloe Barbadosensis*; the Succotrine Aloe, or *Aloe Succotrina*; the White-spined Glaucous Aloe, or *Aloe purpurascens*; the Red-spined Glaucous Aloe, or *Aloe glauca*; the Red-spined Striped Aloe, or *Aloe lineata*; the Great Hedgehog Aloe, or *Aloe ferox*; the Great Soap Aloe, or *Aloe saponaria*; the Common Soap Aloe, or *Aloe obscura*; the Hollow-leaved Perfoliate Aloe, or *Aloe serrulata*; the Upright Perfoliate Aloe, or *Aloe subcrecta*; the Short-leaved Perfoliate Aloe, or *Aloe depressa*; the Dwarf Hedgehog Aloe, or

Aloe humilis; the Great Mitre Aloe, or *Aloe mitræformis*; and the Small Mitre Aloe, or *Aloe brevifolia*, are considered as varieties of the above species.

The Narrow-leaved Tree or Sword Aloe rises with an erect, shrubby stem to some height, sending forth long, narrow, reflex, indented, spinous leaves, that embrace the stem at their base, and a pyramidal spike of red-coloured flowers.

The Broad-leaved Sword Aloe resembles it much; but the leaves are broader, and have several spines on their backs towards their extremities: the flowers also grow in a looser spike.

The Barbadoes Aloe has the leaves about four inches broad at their base, where they are near two inches thick: they have a few indentures on their edges; are of a sea-green colour, and when young are spotted with white. The flower-stem rises near three feet high, and the flowers stand in a slender loose spike, with very short peduncles, and hang downwards: they are of a bright yellow colour, and the stamens stand out beyond the tube. But the form of the flowers, and the manner of flowering, show it to be a variety of the second species. Though generally known by the name of Barbadoes Aloe, it is common in the other islands of America, where the plants are propagated on the poorest land, in order to obtain the Hepatic Aloes.

The Succotrine Aloe has long, narrow, succulent leaves, which come out without any order, and form large heads. The stalks grow three or four feet high, and have two, three, and sometimes four of these heads branching out from it: the lower leaves spread out on every side, but the upper leaves turn inward towards the centre: the flowers grow in long spikes, upon stalks about two feet high, each standing on a pretty long footstalk; they are of a bright red colour tipped with green; and they generally appear in the winter season.

The Great Hedgehog Aloe rises to the height of eight or ten feet, with a strong stem: the leaves grow on the top, which closely embrace the stalk; they come out irregularly, and spread every way; and are near four inches broad at their base, diminishing gradually to the top, where they end in a spine. They are of a dark green colour, and closely beset with short thick spines on every side. This sort has not yet flowered in this country; nor does it put out suckers: so that it is difficult of propagation.

The Great Soap Aloe seldom rises much above two feet in height. The leaves are very broad at their base, where they closely embrace the stalk, and gradually decrease to a point: the edges are set with sharp spines, and the under leaves spread

open horizontally every way; these are of a dark green colour spotted with white, somewhat resembling the colour of soft soap. The flowers grow in umbels on the tops of the stalks, and are of a beautiful red colour, appearing in August and September.

The Common Soap Aloe has broader leaves, of a lighter green; the edges and spines are copper-coloured, and the flowers grow in loose spikes.

The Short-leaved Perfoliate Aloe is a humble plant, seldom rising more than a foot high: the leaves grow near the ground; they are broad at the base, where they embrace the stalk, and gradually diminish to a point; they are of a sea-green colour, with some white spots; their edges, and also their upper parts both below and above, are beset with pretty sharp spines: the flowers grow in loose spikes, the tubulous part being red, and the brim of a light green colour.

The Dwarf Hedgehog Aloe is a very low plant, never rising into stem: the leaves are broad at their base, but taper to a point, where they are triangular; they are beset on their edges and both surfaces with soft spines very closely, from whence this plant has its name. The flowers grow in a loose head on the top of the stalk, which is very thick, but seldom a foot high: they are of a fine red colour below, but of a pale green above. The flowers show that it belongs to the above species, though it may appear different by its habit.

The Great Mitre Aloe grows, with an upright stalk, to the height of five or six feet: the leaves closely embrace the stalks; they are thick, succulent, of a dark green colour, and have spines on their edges, as also a few on their upper surface; they stand erect, and converging towards the top, forming the resemblance of a mitre. The flower-stem rises about three feet in height: the flowers come out at the top of it in a sort of globular spike, which afterwards becomes cylindrical; these have long peduncles, which stand horizontally, and the flowers hang downwards; they are cut to the bottom into six unequal segments, three being alternately broader than the others. Three of the stamens are as long as the tube of the corolla, the other three are shorter; the tube being of a fine red colour, but the brim of a pale green.

The third species, or Common Cobweb Aloe, never rises from the ground, but the leaves spread flat on the surface; they are plain, succulent, and triangular towards the end: the borders and keel are closely set with soft white spines. The flower-stem rises about a foot in height, is very slender, and has three or four small distant herbaceous flowers.

The Small Cobweb Aloe, which is a variety of the above, grows near the ground: the leaves are almost cylindrical towards their base, but angular near their ends, and are set with short soft spines at the angles. The leaves of this variety are shorter and of a darker green colour than those of the former, and the plants produce many suckers on every side.

The fourth, or Pearl Aloe, is of humble growth: the leaves come out on every side, without order, near the ground; they are thick, triangular at their ends, and closely studded with white protuberances; whence its name.

There is a smaller sort which has been long preserved in gardens in this country. The plants flower in several seasons of the year.

The fifth species has long, narrow, tongue-shaped leaves, which are hollowed on their upper side, but keel-shaped below: these are closely studded on every side with small white protuberances, from whence the plant has the title of Pearl-tongue Aloe. The flowers grow on pretty tall stalks, and form loose spikes, each hanging downwards: they are of a beautiful red colour, tipped with green. It produces offsets in plenty, and flowers at different seasons of the year.

The sixth has broader and thicker leaves, spreading out every way, not so concave on their upper surface, nor are the protuberances so large as those of the above sort: the flowers are of a paler colour, and the spikes are shorter.

In the seventh species the leaves are tongue-shaped, three-cornered, gradually drawing to a point, smooth, upright, a span in length. The corolla is sub-cylindrical, thicker at the base, curved back in the middle, angular at the tip; the angles green, somewhat flesh-coloured; the three outer segments divided to the curvature, thicker; the inner ones distinct from each other, but longitudinally connected with the outer ones on the inside. It begins to flower about August, and is a native of the Cape of Good Hope.

There are varieties with large, oblong, white, confluent spots; and with small ones.

The eighth species, or Tongue Aloe, grows with its leaves near the ground; they are about six inches in length. The flowers are in slender loose spikes, each hanging downwards, of a red colour at bottom and green at the top.

There is a variety of this which has the leaves much more spotted.

The ninth species, or Fan Aloe, grows to the height of six or seven feet, with a strong stem, toward the upper part of which are produced two, three, or four heads, composed of long, compressed, pliable leaves, of a sea-green colour, entire, and ending obtusely; these are placed in a double row, lying over each other

with their edges the same way. The flowers are produced in short loose spikes, are of a red colour, and appear at different times of the year.

The tenth species, or Partridge-breast Aloe, is a low plant, seldom rising above eight inches in height. The leaves are triangular, and turn back at their extremities; they are fleshy and entire, their edges being very slightly serrated, being curiously veined and spotted, somewhat like the feathers on a partridge's breast. The flowers grow in very loose spikes, upon stalks about one foot high; they are of a fine red colour, tipped with green. The corolla is flesh-coloured, with a sextid mouth, the three inner divisions alternate, spreading; the stamens bending down, and the stigma simple.

A variety of this has been raised, from seeds received from the Cape of Good Hope, by professor Martyn, in which the leaves were broader, and spreading much more than those of the former; but which were not so beautifully spotted, the flower-stalks growing much taller.

The eleventh species grows near a foot high, and is furnished with triangular leaves from the ground upwards; which are of a dark green colour, and placed in form of a triangle: the flowers grow thinly on very slender peduncles, they are of a herbaceous colour, and their upper part turns backward.

The twelfth grows somewhat like the last, being beset with leaves from the bottom; but which are rounder, and end in sharp points: the flowers grow upon taller stems, which branch out and produce long close spikes.

A variety of this has been raised from seeds, which is much larger, the leaves thicker, and the stem taller.

The thirteenth species, or Cushion Aloe, has very short, thick, succulent leaves, which are compressed on their upper side like a cushion; hence its name. It grows very close to the ground, and puts out suckers on every side: the flowers come out on slender stalks, and are of a herbaceous colour. It much resembles the second species, but is very different in the spike, and figure of the flowers.

In the fourteenth species the stem is round, leafy at the top, three or four feet high, the thickness of the arm. The leaves subverticillate, broad at the base, gradually drawn to a point, channelled, acute, with remote teeth, spreading, two feet long. The flowers are in very close spikes, spreading horizontally, a foot in breadth. It has a single bracte under each flower, ovate, acute, broad, membranaceous, white with three green streaks, a little shorter

than the corolla, which is bell-shaped, almost six-petalled; the three inner segments not connected, broader, ovate, blunt, white with three green lines; the three outer connected with the others at the base, narrower and less concave, but like them. The flower is full of a purple honey juice.

Culture.—The propagation of these plants is effected in different methods according to their nature. As many of the roots afford plentiful supplies of suckers or offsets from their roots, they may be easily raised in that way. And in those which do not possess this property, it may be often accomplished by taking off some of the under leaves. Where ripe seeds can be procured they may also be raised in that method.

But in order to the successful cultivation of the aloe in this climate, it is necessary that it have a proper soil prepared for it. This should be constituted of about one-half of fresh, good, light mould, which has a considerable proportion of decayed vegetable matter in it, and one-fourth part of sea sand, or the scrapings of turnpike roads after they are become dry and of a sandy nature, with an equal quantity of effete lime, such as the siftings of lime rubbish. These substances should be intimately incorporated and blended together by frequent turning over with the spade: and to render them perfectly mellow, and suitable for the purpose, they should be suffered to remain in this state of mixture for eight or twelve months before they are made use of.

With this earthy compost some very small pots are to be filled in a pretty close manner. The suckers, offsets, or root-leaves, are then to be planted out separately in these pots of earth, which should be lightly pressed round them. The most proper season for performing the work is about the middle of July, when the old plants are shifted. The suckers or other parts, which are to be made use of as sets, should be taken off from the old plants with great care; and when they appear in any degree moist on the part where they were separated, it will be necessary to put them by in some dry place out of the ground for a few days before they are planted out, in order that they may be rendered so dry as to prevent their rotting; and in cases where leaves are employed, till the succulent parts that are wounded in their removal be healed over. After being planted out in the pots, they should be slightly watered, and then set in some shady situation for about a fortnight; after which the more tender sorts may be removed into a very moderate hot-bed, being plunged up to the rims. By this means they strike new root more readily. But here it will likewise be necessary to shade

the plants in the heat of the day, and to let them have as much air as possible.

Where leaf-sets are made use of, they should be planted in June, setting the part that was separated from the old plant an inch or an inch and a half into the earth. Some prefer plunging the pots immediately into the hot-bed, as in this way they push forth heads before the winter sets in.

About the middle of August it will be necessary to begin to harden these young plants. This is to be performed by removing the glasses occasionally when the weather is fine, and in other circumstances raising them by props in such a manner as to admit the air freely, and thereby promote their vigour and growth. In this way they will become fit to be removed into the house, which must be performed about the latter end of September. After this the plants are to be treated in the same manner as old plants, as below.

The shifting of the old plants is to be performed at the same period as directed for the planting of the sets. In managing this business the plants are to be removed from the pots, and the earth carefully separated from between the roots. All the decayed and mouldy roots must then be taken off, without breaking or in any way injuring the young ones. When the roots have been thus cleaned, the pots are to be filled about three parts full with the above earthy material, a few pebbles being placed in their bottoms in order to prevent the moisture from stagnating too much about the roots of the plants. The roots are then to be placed out in such a way as not to interfere with each other, more of the compost being afterwards applied so as to fill up the pots to the rims, shaking the plants a little in order to let the mould in between the roots, and settling it with the hand close to them to keep them steady. Water must be immediately applied in a sparing manner, and the plants be set out abroad in some shady situation, where they may remain about three weeks, water being then sparingly administered occasionally when the season is dry and hot.

In a dry time, about the latter end of September, they should be again removed into the house, as much free air as possible being admitted to them while the weather continues warm; but as the nights begin to be cool the glasses should be shut up, air being only admitted in the day-time; and in proportion as the cold increases they should not be opened at all, though water should be frequently given in small proportions till towards the middle of October, after which it should be decreased according to the temperature of the

house in which they are kept. Those plants which are preserved in stoves generally require to be watered at least once a week the greatest part of the winter; while those which are kept in greenhouses, without artificial heat, do not stand in need of being watered oftener than once a month in that season.

While the harder sorts of Aloes are set out abroad in the summer, they should have but little water given them; and when much rain falls during the time, they should be screened from it in some way or other; as, when they imbibed much wet in that season, they frequently rot the following winter, especially if they are kept in a moderate warm air: consequently, those who choose to treat the plants in a hardy manner should be cautious of their receiving too much moisture during the summer season.

These sorts thrive much better when they are thus exposed in summer, and secured from the cold and rain in winter, than if they were treated more tenderly: as, when they are placed in stoves, from their being kept growing all the winter, they are drawn up weak; and though they may flower oftener when they have a moderate share of heat, in two or three years the plants do not appear so handsome as those which are treated more hardily.

All the tender sorts, as the Cobweb, the Upright Triangular, and the Great Hedgehog Aloes, should either constantly remain in the stoves, or be removed in summer to glass cases, where they may have a free admission of air in warm weather, and at the same time be protected from rain and cold. In this management the plants mostly thrive and increase perfectly, and such of them as usually flower produce them in beauty at their proper seasons.

In respect to the culture of the Aloe plant in the island of Barbadoes, it is remarked by Mr. Millington, in a paper in the Medical Journal, that the grounds to the distance of two or three miles from the sea, which are subject to be injured by drought, and which are so shallow and stony as not to admit of the successful planting of the sugar-cane, are found the most adapted to the raising of the Aloe plants. In preparing the land, the stones, at least the larger ones, are first picked up, and either packed in heaps upon the most shallow, barren spots, or laid round the field as a dry fence. It is then lightly ploughed, and very carefully cleared of all noxious weeds, marked with lines at one foot distance from row to row, and the young plants set, like those of the cabbage, at about five or six inches from each other. This regular mode is, however, only practised by the more exact planters, to facilitate the

weeding of them by hand; as, if the plants are not kept perfectly clean, and free from weeds, the produce is very small. They bear being planted in any season of the year, even the driest, as they will live on the surface of the ground, without any rain, for many weeks.

The method of collecting the juice of the plants, and preparing the resinous extract, is described in the following manner in the new edition of Miller's Dictionary:

In the month of March, when the plants are a year old, the labourers carry a parcel of tubs and jars into the field, and each takes a slip, or breadth of it, and begins by laying hold of a bunch of the blades, as much as he can conveniently grasp with one hand, while with the other he cuts it just above the surface of the earth, as quickly as possible (that the juice may not be wasted,) and then places the blades in the tub, bunch by bunch or handful by handful. When the first tub is thus packed quite full, a second is begun, (each labourer having two,) and by the time the second is filled all the juice is generally drained out of the blades in the first tub. The whole of the blades are then lightly taken out, and thrown over the land by way of manure, and the juice is poured out into a jar. The tub is then filled again with more blades, and so alternately, till the labourer has produced his jar full, or about four gallons and a half of juice, which is often done in six or seven hours: and he has then the remainder of the day to himself, it being his employer's interest to get each day's operation as quickly done as possible. Though the Aloe plants are often cut in nine, ten, or twelve months after being planted, they are not in perfection till the second or third year: but they are productive for a length of time, as ten or twelve years, or even for a considerably longer time, if good dung or manure of any kind be strewed over the field once in three or four years, or oftener. As the aloe-juice will keep for several weeks without injury, it is not boiled till a sufficient quantity is collected to make it an object for the boiling-house. In the large way, three boilers, either of iron or copper, are set up for one fire, though some have but two, and the small planters only one. The boilers are filled with the juice; and as it ripens, or becomes more inspissated, by a constant regular fire, it is ladled forward from boiler to boiler, and fresh juice added to that furthest from the fire, till that which is in that nearest the fire, which is much the smallest, and commonly named *tatch*, as in the manufacture of sugar, becomes of a proper consistency to be skipped, or ladled out into gourds, or other small vessels destined for its final reception. The proper time to skip or ladle it out of the *tatch* is when it is arrived at what

is termed a resin height, or when it drops freely, or in thin flakes, from the edges of a small wooden slice, that is dipped from time to time into the *tatch*, for that purpose. Some aloe-boilers make use of a little lime water during the process, when the ebullition is too great.

The process of sun-drying is very simple, though extremely tedious. The raw juice is either put into bladders, left quite open at top, and suspended in the sun, or into broad shallow trays of wood, pewter or tin, and exposed in the same manner every dry day, until all the fluid parts are exhaled, and a perfect resin formed, which is then packed up for use, or exportation.

The extract prepared from the Barbadoes Aloe is generally of a coarse appearance.

That of the best quality has the name of Succotrine Aloes, from the circumstance of the island of Zocotra or Socotora, in the straits of Babel-mandel, having formerly been famous for the preparation of the extract. It is of a yellowish brown colour, approaching to purple, and when reduced to powder has a sort of gold colour.

The Aloe plants, from the great differences in their heights, modes of growth, and the shapes of their leaves, as well as the beauty of their flowers, are well adapted for the purpose of affording variety, and producing a singularity of effect in the greenhouse, or in courts or other places about the house during the summer season.

ALOE *Africana*. See CRASSULA.

ALOE *Americana*. See AGAVE.

ALOE *Uvaria*. See ALETRIS.

ALSTROEMERIA, a genus comprising different herbaceous perennial plants of the exotic kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters of which are: that it has no calyx: the corolla is six-petalled and sub-bilabiate, the three outer petals being wedge-shaped, retuse, mucronate; the inner, which are alternate with the others, lanceolate, the two lower ones tubulous at the base: the stamina have awl-shaped filaments, bending down and unequal: the antheræ oblong: the pistillum has a germ inferior, hexangular, truncate, the style bending down, filiform, of the length of the stamen: the stigmas three, oblong and bifid: the pericarpium is a roundish, six-ribbed, mucronate capsule, three-celled and three-valved: the valves concave, and contrary to the dissepiment: the seeds very many, globose, covered with raised points, sub-umbilicate at the tip.

The species more generally cultivated are:

1. *A. pelegriana*, Spotted-flowered Alstroemeria;
2. *A. Ligtu*, Striped-flowered Alstroemeria;
3. *A. Salsilla*, Climbing Alstroemeria;
4. *A. multiflora*, Many-flowered Alstroemeria.

The first species rises with several erect herbaceous stems, to the height of three feet, having linear spear-shaped leaves, the branches being terminated by flowers on long foot-stalks, two or three together, mostly of a whitish colour, but very beautifully stained and varied with purple and red. It flowers from the latter end of May or beginning of June till October.

The second has erect herbaceous barren stems clothed with awl-shaped leaves pressed to them; terminated with spatulate-oblong leaves, placed in a kind of rose. The floriferous stem also is clothed with awl-shaped leaves, clasping close to it, and terminated with a shorter involucre. The peduncles are few, very simple, naked, longer than the involucre. The three upper petals of the corolla are larger, white, dotted at the base, spotted at the tip with red; the three lower ones shorter, especially the lowest, almost awl-shaped, and red. The filaments are longer than the lower petals, and rugged; the antheræ twin, yellow; the pistil red. It is remarkable for the largeness of the flowers, and for their fragrantcy. It flowers in the spring, the greater part of the summer, and autumn.

The third species rises with twining climbing stems, with spear-shaped, acuminate, nervose leaves; the petioles naked. Involucre many-leaved, awl-shaped, reflex. The peduncles few, elongated, sustaining one or two flowers; a bracte at the branching of the peduncles: petals from erect spreading, rather blunt; the outer ones red, the inner of a greenish colour.

The fourth species has the habit and structure of the above; but the petioles are wrinkled at the edge, and the umbel is not peduncled: the many-flowered involucre consists of broader leaflets; the peduncles are quite simple and naked; the flowers are of the size of the Salsilla: the three outer petals shorter, narrower, entire; the inner truncate, or emarginate with a point.

These are all natives of South America.

Culture.—These plants are capable of being propagated in different ways, as by seeds, cuttings of the stalks, and parting the roots. In the first method, which is mostly practised in raising the Spotted-flowered kind, the seed should be sown in the spring in a pot of light earth, and immediately plunged into a very moderate hot-bed of either bark or dung. In the other two methods the spring is also the best season for raising the plants, the cuttings or parted roots being placed in pots filled with light mould, and directly set in hot-beds which possess only very gentle heats. They should remain in these till the plants have fully stricken root; when during the summer months they may be placed under the protection of the greenhouse, being occasionally

very slightly watered, and having a pretty free admission of air.

The first species is much more hardy than the second, so much so as to be capable of being treated as a greenhouse plant. But though this may be the case, it, as well as the other sorts, not only flowers, but ripens seeds better when kept under the glass of a hot-bed frame, where there is a full admission of air.

These are plants, that, from the beauty of their flowers, which continue in blossom in succession the greatest part of the summer, deserve to occupy the more conspicuous situations in greenhouse and stove collections.

ALTHÆA, a genus comprehending different herbaceous perennials of the Marsh Mallow kind, which are mostly plants of hardy growth.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

Its characters are; that the calyx is a double perianthium, outer smaller, one-leaved, unequally novem-fid or nine-cleft, (6—12,) divisions very narrow, inner semiquinquefid, divisions broader and sharper: the corolla is five-petalled, united at the base, obcordate, præmorse and flat: the stamina have many filaments inserted into the corolla; antheræ subreniform: the pistillum has an orbiculate germ, style cylindrical, and short, stigmas many (20), setaceous, of the length of the style: the pericarpium consists of arils not jointed, forming a flat ring, about a columnar receptacle: they are deciduous, and open on the inside: the seed is one, flat-kidney-shaped, in each aril.

There are several species, but those mostly cultivated are: 1. *A. officinalis*, Common Marsh Mallow; 2. *A. cannabina*, Hemp-leaved Marsh Mallow; 3. *A. hirsuta*, Hairy Marsh Mallow.

The first species has a perennial root, and an annual stalk, growing erect, to the height of four or five feet, and putting out a few lateral branches. The leaves are soft, angular, and alternate. The flowers axillary, being shaped like those of the Mallow, but smaller and of a pale colour. They appear in June or July, and the seeds ripen in September. It grows naturally on salt marshes and the banks of rivers.

There is a variety of this with the leaves rounder, and not ending in a point; and another with lacinated leaves.

The second species has a woody stem, which rises to the height of four or five feet, and puts out many side branches. The leaves are alternate. The flowers axillary, not so large as those of the Common Marsh Mallow, but of a deeper red colour, and the calyx much larger. It seldom flowers the first year, unless the summer prove warm; but when the plants live through the

winter, they flower early the following summer, and produce good seeds. It grows naturally in Hungary.

The third is a low plant, the branches trailing on the ground. The leaves and stalks are beset with strong hairs; the flowers axillary, smaller than those of the common sort, and have purplish bottoms. The leaves are deeply cut into three parts, and have long petioles. The stalks are woody, but seldom last more than two years.

In all the species and varieties the roots are of the fibrous and perennial kind.

Culture.—The propagation in the first species may be effected with great facility, either by seeds or parting the roots. In the first method, the seeds should be sown in beds, or other situations where the soil inclines to moisture; as under such circumstances the plants grow to a larger size; but they will succeed in any kind of land. The latter mode is best performed in the autumnal season, as soon as possible after the stems decay; the roots being set out in similar situations to those employed for the seeds. If a number of the plants be set out together, as the roots spread much, they should not stand nearer than two feet.

The second species must be raised from seeds, which should be sown in the spring. They should, if possible, be sown in the situations where the plants are to remain; but if that cannot be the case, it is necessary that they be transplanted while very young, in order to secure their perfect growth. And that the plants may survive the severity of the winters in this climate, it is essential that they be set out in a dry soil and sheltered situation. They endure the cold better when planted in lime rubbish, or in soils that are of the more stony kinds; but the plants are not so perfect in their growth. The plants of this species seldom continue longer than two years in this climate. They must therefore be renewed from seed occasionally, which is easily done on account of its ripening well in this climate.

The third species should likewise be propagated by seed, which must be sown in the beginning of April, upon light, rather moist earth, in the situations where they are to remain; as from the roots of the plants shooting deep, they rarely succeed when transplanted, except it be performed while they are very young, and when the season is inclined to be moist.

These plants, from the singularity of their leaves, may be admitted in shrubbery and other compartments of gardens and pleasure-grounds, for the purpose of introducing variety among the herbaceous plants.

ALTHEA *Frutex*. See HIBISCUS.

ALYSSUM, a genus which comprises several

species of under shrubby, herbaceous, perennial plants of the *Alysson* or *Mulicoid* kind; that are chiefly flowery and ornamental.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliquosae*.

The characters of which are: that the calyx is a four-leaved, oblong perianthium, the leaflets ovate, oblong, obtuse, convergent, and deciduous: the corolla four-petaled and emiciform: the petals flat, shorter than the calyx, very spreading, having claws of the length of the calyx: the stamina have six filaments of the length of the calyx, two opposite, a little shorter, marked with a toothlet: antheræ from erect spreading: the pistillum has a sub-ovate germ, the style simple, of the length of the stamina, longer than the germ, and the stigma obtuse: the pericarpium is a sub-globose, emarginate silicle, or broad and short pod, with a style of the length of the silicle, two-celled, the partitions elliptic, and hemispherical; the seeds are fixed to filiform receptacles issuing forth at the end of the silicle, few and orbicular.

There are many species, but those chiefly cultivated are: 1. *A. spinosum*, Thorny or Prickly Alysson; 2. *A. halimifolium*, Sweet or Sea Purslane-leaved Alysson; 3. *A. saxatile*, Yellow Rock Alysson; 4. *A. incanum*, Hoary Erect Alysson; 5. *A. calycinum*, Calveine Alysson; 6. *A. campestre*, Field Alysson; 7. *A. creticum*, Cretan Yellow Alysson; 8. *A. deltoidum*, Deltoid-leaved Alysson; 9. *A. montanum*, Mountain Dark-yellow Alysson.

The first species has woody branches, which rise about two feet high, and are armed with small spines. The leaves are hoary, lanceolate, and thinly placed on the stalks without any order. The flowers grow in small clusters at the extremities of the branches. The petals are white and entire, and the filaments toothless. It is a native of Italy.

The second species spreads itself upon the ground, and never rises to any height. The leaves are narrow, spear-shaped, pointed, and entire. At the extremities of its branches it produces very pretty tufts of small white-coloured flowers, of which the plant is seldom destitute for six or seven months together. In it the stamina are simple, and the silicles roundish and entire. It is a native of the southern countries of Europe.

The third is also a low plant, with a fleshy stalk, which seldom rises more than one foot high, but divides into many smaller branches, which grow near the ground, so that a single plant spreads to a considerable distance. The leaves are spear-shaped, soft waved and entire: the flowers produced in loose panicles at the extremity of every branch, and are of a bright yellow-colour.

They mostly appear about the end of April or beginning of May; and, if the season be moderate, continue three weeks or more in beauty. It is a small, showy, hardy plant, and not disposed to overrun others. It frequently flowers a second time in autumn.

The fourth species grows to the height of two feet, having woody stalks, which divide into several branches towards the top. The leaves are spear-shaped, hoary, and entire. At the extremity of every shoot the flowers are produced in round bunches; and are small and of a white colour. The silicle is entire, oval, and full of brown seeds. It grows naturally in the South of France.

The fifth is nearly of similar growth in the stem, and the leaves have much resemblance; but the four longer filaments are toothed in the middle within, and the two shorter ones put out from their base a lance-shaped scale, the length of the germ. The petals are very small, scarce apparently emarginate, yellow, but growing white with age. Silicle slightly emarginate, with two seeds in each cell. It is found wild in Austria.

The sixth is very like the last in stem, leaves, and petals, but is more decumbent, and has lance-ovate leaves. The filaments have no teeth, but the two solitary ones have a bristle on each side, not growing to the filament, but inserted into the receptacle. Silicles ovate, scarcely compressed, more downy. It is found in France, &c.

The seventh species grows more erect, having a shrubby stalk, which sends out a few lateral branches towards the top, with oblong hoary leaves. The flowers grow in small clusters at the extremities of the branches. It seldom continues longer than two years in England; and in a warm, dry situation, will live in the open air. It is found in Spain, &c.

In the eighth, the stems are woody, filiform, diffused, and hairy, the older ones having the bases of the petioles toothleted, and are flexuose. The leaves are lanceolate, with a strong angle or two on each side, as it were deltoid, green, with a few hairs. The raceme is simple, few-flowered: the flowers resemble those of the Stock Gilliflower, and are of a purple colour: the calyx is oblong, closed, and gibbous at the base. It has been found in the Levant.

In the ninth species, the branches are trailing: the leaves oblong, hoary, rough to the touch, and alternate. The flowers are produced in small clusters at the extremities of the branches, and are of a dark yellow colour. Four of the filaments are bifid at the top; the two others have a toothlet at the base. It grows naturally upon rocks in Burgundy, and some other parts of France, &c.

Culture.—The propagation of these plants may be effected in different ways. It may be accomplished in all the sorts by means of seeds; and in most of the kinds by slips and cuttings from the shoots. In the first method, the seeds should be sown upon a border of rather poor, dry, light earth, about the beginning of April, being lightly raked in. When sown on rich soils the plants seldom survive the winter in this climate; but if they be put in on such as are of a dry, rocky, or gravelly nature, and of a bad poor quality, they not only withstand the cold better, but continue much longer, as they are less succulent, and of course less affected by frosts in the winter season.

In this mode of sowing, the plants will be ready to be transplanted in the beginning of the following autumn. The business should be performed when the weather is not too moist.

As the second kind rarely continues more than two or three years in this climate, it must be often sown to preserve it; but where the seeds are suffered to fall and remain upon the ground, the plants often rise without any trouble or difficulty.

In the third sort the seeds mostly ripen in July; but it is only from the young plants that they can be expected, as the old ones, or those which are raised from slips or cuttings, rarely produce any in this climate.

The fourth kind mostly flowers from June to September, and the seeds ripen soon after; which, if they be permitted to scatter, the plants will come up, and require little care or trouble afterwards.

The fifth and sixth sorts should always be sown where they are to remain; and if they be thinned and kept clean from weeds, they will flower in July, and perfect their seeds in autumn.

But the seeds in the seventh sort should be sown in August, soon after they are ripe; and where a few of the plants are sowed in October, and sheltered under a frame in winter, they will flower the following June, by which means good seeds may be obtained the same year; as those plants, which arise early in the year, grow luxuriantly in summer, but do not often ripen seeds, or live through the winter season.

In the second and third methods, or those by slips and cuttings, the sets are best put in on dry borders about the latter end of April or beginning of May, the mould being applied closely round them. They should afterwards be shaded in the heat of the day, and watered occasionally till they have stricken root.

The eighth sort, as it rarely produces seed in this climate, may be best propagated from its trailing branches, which, if planted in April, will take root and become good plants by the follow-

ing autumn, when two or three of them may be placed in a common frame for shelter in winter, in order to preserve the species; as in hard winters, those which are exposed are sometimes destroyed.

This is properly a rock plant, being hardy, and forming with very little care a neat tuft of flowers, and is not apt to encroach on its neighbours. It is valuable as an ornamental plant from its beginning to flower in March, and continuing through the summer. All these plants may be employed in borders for the purpose of affording variety, and some of them in the way of adorning rock-works.

AMARANTHUS, a genus comprising many plants of the *Prince's Feather* kind. They are universally herbaceous annuals, several of them being highly beautiful and curious. They are likewise sometimes distinguished by the titles of Flower Gentle, Love-lies-bleeding, &c.

It belongs to the class and order *Monœcia Pentandria*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that those species which have male flowers on the same plants with the females have a calyx, which is a five- or three-leaved perianthium, upright, coloured, and permanent; the leaflets lanceolate, and acute: no corolla: the stamina have five or three capillary filaments, from upright patulous, of the length of the calyx, the antheræ oblong and versatile. Of those which have female flowers in the same raceme with the males, the calyx is a perianthium the same with the former: no corolla: the pistillum has an ovate germ; the styles three, short and subulate: stigmas simple and permanent: the pericarpium is an ovate capsule, somewhat compressed, as is also the calyx on which it is placed, coloured, and of the same size; three-beaked, one-celled, cut open transversely: the seed is single, globular, compressed, and large.

The species that demand attention for the purpose of cultivation are very numerous, but those most generally cultivated are: 1. *A. melancholicus*, Two-coloured Amaranthus; 2. *A. tricolor*, Three-coloured Amaranthus; 3. *A. sanguineus*, Spreading or Bloody Amaranthus; 4. *A. caudatus*, Pendulous Amaranthus, or Love-lies-bleeding; 5. *A. maximus*, Tree Amaranthus; 6. *A. cruentus*, Various-leaved Amaranthus; 7. *A. hypochondriacus*, Prince's-feather Amaranthus.

The first, or Two-coloured Amaranthus, has the stem upright, half a foot high, dark purple, smooth, streaked, and simple: the leaves are blunt, wrinkled, waved, emarginate, mucronate, with a short white point; the lower ones rufous liver-coloured on the upper surface, bright purple on the lower,

with elevated veins: the upper ones green, with red tips: the petioles channelled, bright purple, smooth, edged at top with the decreasing leaf: the lower ones nearly the length of the leaves: the glomerules subsessile, dark purple, on a very short undivided peduncle: the calyxes five-leaved: the leaflets oblong, purple, membranaceous, ending in a dark red point. Professor Martyn observes that this species varies in the colour of the leaves; as in the open air they are of a dirty purple on their upper surface, and in the younger ones green; while in the stove the whole plant is of a fine purple colour. It is, however, easily distinguished in all states by its colour, its leaves, and the lateness of its flowering, which is after all the others are past. It is a native of Guiana and the East Indies. Mr. Miller remarks that it grows to the same height with the Tricolor, and in the manner of its growth greatly resembles it; but that the leaves have only two colours, an obscure purple and a bright crimson, so blended as to set off each other, making a fine appearance when the plants are vigorous.

The second species, or Three-coloured Amaranthus, has the stem a foot and half or two feet in height, obscurely angular, smooth, and upright: the leaves blue with a red point, smooth, and waved: the younger ones red with yellow tips: those in a more mature state coralled at the base, violet in the middle, and green at the end: the old ones green with a violet base: the petioles very long, smooth, green, channelled, and bordered: the glomerules geminate, green, axillary: the calyxes three-leaved: the leaflets oblong, acuminate, membranaceous, with a green nerve. It varies in the colour of the leaves, which are less painted in the open air than in the stove. It has been long cultivated for the beauty of its variegated leaves, in which the colours are elegantly mixed. When the plant is in full vigour these are large, and closely set from the bottom to the top of the stalk: the branches also form a sort of pyramid; so that there is scarcely a more handsome plant when it is in full lustre. It flowers from June to September. And it is a native of Guiana.

The third, or Bloody-leaved Amaranthus, has the stem upright, four feet high, firm, red, round, and streaked: the leaves somewhat convex, or rather so contracted as to have the form of a boat, and pointed; the older ones rather blunt: the upper surface is a mixture of red and green, the lower more or less purple: the petioles are tinged with purple, channelled, roughish; winged at top with the leaf: the racemes very red: the branches smooth, the lower one spreading: the calyxes five-leaved: leaflets oblong, blunt, membranaceous, and red: the bractæ sub-

lato-setaceous, red, longer than the flowers, closely surrounding the glomerules.

The fourth species, or *Pendulous Amaranthus*, has the stem generally two feet high, green, obscurely angular, grooved and streaked, smooth, covered at top with thin, whitish, scattered hairs: the upper part nods on account of the great length of the racemes: the leaves are smooth, bright green, blunt, emarginate, with an incurved transparent point: the petioles much shorter than the leaf: the racemes terminating, elegantly purple, very long, cylindrical, composed of flowers very closely glomerate: the calyxes five-leaved: the leaflets oblong, red, acuminate, membranaceous: the bractæ oblong, pointed, and scattered.

The fifth, or *Tree Amaranthus*, rises to the height of seven or eight feet, sending off numerous horizontal branches at every ten or twelve inches: the leaves are rough, green, and luxuriant: the spikes are seldom half the length of those of the other sorts, but are much thicker. It is said to degenerate gradually into the smaller kind. The seeds, which at first are white, also become red. It flowers in August and September. And it is a native of Persia, &c.

In the sixth species, the stem is a foot and a half or two feet in height, grooved, green with red streaks, smooth, and slightly pubescent among the flowers: the leaves are green, spotted with brown above, red beneath, bluish with a reddish short point: the petioles red, channelled, and smooth: the racemes red and green, with branchlets spreading and nodding a little: the calyx five-leaved: the leaflets oblong, pointed, white-membranaceous, with a red nerve, and a point of the same colour.

It varies of a shining red colour,—with a red stalk with pale leaves,—with a green stalk with variegated leaves, &c. As first cultivated in this climate, according to professor Martyn, the stem was wholly red and smooth; the petioles, ribs, and nerves of the leaves underneath purple; the spikes purple, much spreading, and a little nodding. They were of course very beautiful, and made a gay appearance for the two first years: but afterwards the seeds degenerated, and the plants had little beauty; which is the same with some other species of this genus. It is a native of the East Indies.

In the seventh species, the stem is erect, a foot and a half or two feet in height, smooth, except under the leaves, where it is a little scabrous, reddish, roundish, streaked, and grooved: the leaves are red and green, acute, with elevated veins: the petioles are channelled, and of a reddish colour: the racemes are naked, red, lateral, short, and placed about the stem without order:

the calyxes are five-leaved: the leaflets oblong, acute, membranaceous, and red.

It varies with leaves more or less red,—with very red and paler racemes,—with a green and red,—with a rough and smooth stalk. It flowers from July to September. And it is a native of Virginia.

Culture.—The propagation in most of these species is not effected without considerable trouble, as they require the aid of artificial heat, in order to bring them forward in the greatest perfection. There are a few, however, that may be raised in the open ground without the assistance of heat applied in the above manner.

The two first, as being the most tender, demand much greater attention and more artificial heat in producing them, than those of the third, fourth, and fifth kinds. And the sixth and seventh species are capable of being raised with still less heat than those of the above sorts, though not in the fullest perfection without a slight degree of it.

In all the different species the business is accomplished by sowing the seeds annually in the early spring months, as about the latter end of March or beginning of April, on beds of good earth, either over heat or in the natural ground, according to the nature of the plants. The earlier the sowing can be performed, the better growth the plants will attain in the summer season.

In raising the two first sorts in the greatest lustre and perfection, the aid of two or three different hot-beds is necessary; which should be covered with frames and glasses, so as to slide with ease and convenience. The first of these hot-beds should be small, and made in the ordinary way, for the purpose of receiving the seed, and which may likewise serve for that of other annuals of the tender kind of similar growth. They should be earthed over the top within the frames, to the depth of five or six inches, with good light dry mould. In this the seed should be sown in small shallow drills, and covered over very lightly with fine sifted mould: the glasses are then to be placed over. In these situations the plants should be suffered to remain till they have attained the height of two or three inches, air being admitted in fine days, and the glasses covered at nights with garden mats. When the plants are in this situation, a second hot-bed is to be prepared in the same manner, into which the young plants are to be pricked out to the distance of about four inches from each other, moderate waterings being occasionally given, and the plants well shaded from the sun till they have taken fresh root. Air should now be admitted more freely when the weather is fine, by raising one end of the glasses, and the night

coverings be carefully applied. After the plants have remained in these beds a month or six weeks, and are become tolerably strong in their growth, so as to require more space, the final hot-beds should be made ready. These ought to be of much larger dimensions. When the frames are placed over them, earth to the depth of four or five inches should be laid over; and the plants, after being taken up with balls of earth about their roots, planted in pots of about the twenty-fourth size, water being immediately applied in a sparing manner, and the pots plunged in the earth of the beds, the frames being raised occasionally, as the plants advance in growth. The lights are to be constantly kept on, but air freely admitted by raising the ends daily, and water applied every day or two. Towards the end of June the plants will have risen to nearly their full size; when they may be placed out in the open air, where they are fully seen when the weather is fine and settled, each of them being supported by a handsome stick.

In their after culture, they require to be kept constantly in the pots, and to have water freely applied almost every day when the season is hot. See ANNUAL PLANTS.

In order to procure the seed of these kinds in perfection, it is the best method to put a few of the best plants in a deep frame towards the latter end of the summer, that they may, by being more perfectly sheltered by the glasses, be rendered more fully ripe.

In the culture of the third and fourth sorts, as they are more hardy, one or two moderate hot-beds at most will be fully sufficient for raising the plants. In these cases, the seeds should be sown upon a moderate hot-bed towards the end of March; and when the plants come up they should have a considerable share of air admitted to them in mild weather, in order to prevent their drawing up in too weak a state: and when they are become large enough to be transplanted out, another moderate hot-bed should be provided, into which they should be removed, placing them at six inches distance in every direction, care being taken to water them as well as to shade them from the sun in hot weather, until they have taken new root: after which the air should be freely admitted to them at all times when the season is favourable. Their waterings should likewise be frequent, but not given in too great quantity at a time. As the plants advance in growth, and the warmth of the season increases, they should have a greater proportion of air, that by degrees they may be hardened so as to bear the open exposure. In the beginning of June the plants may be taken up with large balls of earth about their roots, and planted some into pots,

and others in the borders or other parts of the pleasure-grounds, shading them carefully until they have taken good root: after which they should be frequently watered in hot dry weather, especially those in the pots; as every evening or oftener.

As the Tree *Amaranthus* does not thrive well in pots, it should be planted in a rich light soil, and be allowed plenty of room, and a full supply of water, as often as may be necessary. In these circumstances it frequently attains a considerable size, especially in dry seasons.

The two last species are capable of being raised upon warm dry borders with tolerable facility: but they neither attain the full growth, afford such large flower-spikes, or appear in such early perfection, as when managed in the manner of the above.

In preserving the seed of the last five sorts, some of the largest and finest spikes should be collected, as they ripen, towards the latter end of September, and exposed to the full sun in some dry airy situation until they become perfectly dry, when the seeds may be rubbed out and put by in a dry warm place.

Persons who are curious in raising these annual plants in great perfection, find it convenient to have a glass case erected, with upright sloping glasses on every side, having a pit in the bottom for tan, in which the pots are plunged. If this be raised eight or nine feet to the ridge, and the upright glasses are five feet, there will be room and light enough to raise these as well as many other plants of a similar growth to great perfection: and, by such a contrivance, many of those tender annual plants, which rarely perfect seeds in this climate under other circumstances, may be brought forward so as to ripen their seeds in a perfect manner.

All these plants are highly ornamental, the more tender sorts being mostly distributed in mixture with others of the showy kinds in places immediately about the house; while those that are more hardy afford much ornament and variety in the borders, clumps, and other situations in gardens or pleasure-grounds. They should have rather open exposures, and be distributed towards the fronts, especially those of the low growing kinds.

AMARANTHUS, *Cocks-comb*. See *CERLOSIA*.

AMARANTHUS, *Globe*. See *GOMPHRENA*.

AMARYLLIS, a genus comprehending several species of the *Lily-Daffodil* kind of plants; all of which are of the bulbous-rooted tribe, and mostly ornamental.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceae*.

The characters are: that the calyx is a spathe, oblong, obtuse, compressed, emarginate, gaping on the flat side, and withering: the corolla has six petals, lanceolate: the nectary has six very short scales, without the base of the filaments: the stamina have six awl-shaped filaments, with oblong, incumbent, rising antheræ: the pistillum has a roundish, furrowed, inferior germ, the style filiform, almost of the length and in the situation of the stamina: the stigma trifid and slender: the pericarpium is a subovate, three-celled capsule, and the seeds are several. The inflection of the petals, stamina, and pistillum, is very various in the different species of this genus; and the corolla in most of the species is rather hexapetaloid than six-petalled.

The species are very numerous, but those principally cultivated are: 1. *A. lutea*, Yellow Amaryllis, or Autumnal Narcissus; 2. *A. Atamasco*, Atamasco Lily; 3. *A. formosissima*, Jacobæa Lily; 4. *A. Regina*, Mexican Lily; 5. *A. purpurea*, Purple-flowered Amaryllis; 6. *A. Belladonna*, Belladonna Lily; 7. *A. vittata*, Superb or Ribband Amaryllis; 8. *A. longifolia*, Long-leaved Amaryllis; 9. *A. orientalis*, Broad-leaved African Amaryllis; 10. *A. Sarniensis*, Guernsey Lily; 11. *A. Zeylanica*, Ceylon Lily; 12. *A. latifolia*, Broad-leaved Amaryllis.

In the first species, or Yellow Amaryllis, the flower-stems seldom rise above three or four inches in height: the flowers are shaped somewhat like those of the Large Yellow Crocus, one coming up from each sheath: the leaves are green, and come up at the same time, like the Saffron; and after the flowers are past, they increase all the winter. The roots are shaped like those of the Narcissus. It flowers in September, and is a native of the South of France.

The second species, or Atamasco Lily, has the flowers at their first appearance of a fine carnation colour on the outside, but which fade till they are almost white. They are nearly as large as those of the Small Orange Lily, but do not grow above six or eight inches in height. They appear about the end of May or beginning of June, and sometimes in August. It is a native of Virginia.

In the third, or Jacobæa Lily, the flower-stems are produced from the sides of the bulbs, so that after the flower produced on one side is decayed, another stalk arises from the other side of the bulb; but there is usually no more than one flower produced on the same stalk. The flowers are large, and of a very deep red: the under petals are very large, and the whole flower stands nodding on one side of the stalk, making a most beautiful appearance. It is a native of South America.

The fourth, or Mexican Lily, has the bulb of a green colour; the scape round, and sub-compressed. The corolla scarlet, with a bottom of a whitish green: the three outer petals reversed at the tip, the three inner fringed at the base, the style red. The flower-stems seldom rise more than one foot in height; each stem supports two, three, or four flowers, rarely more; they are large, and of a bright copper-colour, inclining to red: the spathe, which covers the buds before they open, divides into two parts to the bottom, standing on each side the umbel of flowers, joined to the peduncles. It flowers constantly in the spring, when it is placed in a very warm stove; and is in beauty in February; those which are in a moderate temperature of air, flowering in March or April.

In the fifth the corolla is large, and of a blood-red, or purple-colour, and there are three or four large bell-shaped, rather erect flowers coming from each sheath. It is a native of the Cape of Good Hope.

The sixth, or Belladonna Lily, differs from the fourth species in having the edges of the petals waved, and not reversed at the tip. The scape is purple, sustaining from five to seven flowers, in shape like the Common Red Lily, and nearly as large, but of a soft purple colour, inclining to white on the inside toward the bottom, and having an agreeable scent. It usually flowers about the end of September, or the beginning of October, in this climate; and if the roots are strong, the stems will rise upwards of two feet high. If the season is favourable, or the flowers be screened from frosts, violent winds and heavy rains, they continue in beauty a month or longer; and are very ornamental plants at a season when there is a great scarcity of flowers. It is a native of the West Indies.

In the seventh, the petals uniting at bottom form a fleshy tube, but the edges of the outer ones are free at the base. It has been named *vittata*, from its ribband-like appearance, being striped with red on a white ground. The stem rises to the height of three feet or more, and produces from two to five beautiful flowers. It usually blossoms in April or May, but may be forwarded by artificial heat.

In the eighth species, the flower-stem rarely rises more than three or four inches in height, but supports a great number of flowers, of a deep purple-colour, appearing in December. The bulbs are large, and the leaves long and narrow. It flowers here in July, and is a native of the Cape of Good Hope.

In the ninth, or Broad-leaved African Amaryllis, the bulbs are large and almost round; the leaves long, broad, and rounded at their extremities, spreading two ways on the surface of the

ground, and do not come up till after the flower-stem appears, which is generally in November; and after the flowers are past, the leaves increase till spring, and in May they begin to decay, so that from the middle of June to October the plant is void of leaves. It grows naturally at the Cape of Good Hope.

In the tenth species, or Guernsey Lily, the bulb is an oblong spheroid, flattened most at the lower end, six or seven inches round where thickest: the leaves are of a dark willow green colour, shining, from half an inch to three quarters of an inch in breadth, a little blunt at the end, from two to four in number, rarely five. The scape is flattened, twelve or fourteen inches in height, and more. The spathe splits, and falls back in two unequal pieces of a reddish colour and triangular figure. The pedicels are from an inch to almost two inches in length. The number of flowers commonly from eight to twelve, the circumference of each being about seven inches. The corolla, when in its prime, has the colour of a fine gold tissue wrought on a rose-coloured ground; and when it begins to fade, it is a pink: if beheld in a full sun-shine, it seems to be studded with diamonds, but by candle-light the specks or spangles look more like fine gold dust: when the petals begin to wither, they assume a deep crimson colour. The flowers begin to come out at the end of August, and the head is usually three weeks in gradually expanding itself. This beautiful plant is a native of Japan, and has been long naturalized in Guernsey.

The eleventh species has the stature of the *Crinum Americanum*. The leaves are fleshy, scabrous with a toothleted edge. The spathe bivalve, besides some interior scales or fragments. The germs are sessile. The tube of the corolla of the same colour with the scape, which is rufous. The border white, with lanceolate, recurved petals, with a red keel underneath. The filaments and style are of a blood-red colour, and the pericarps viviparous.

The twelfth has roots like the *Crinum* mentioned below: the leaves narrower at their base, and stained with purple on their under side; the scapes purple, and growing to the same height as those of the *Crinum Asiaticum*; the flowers of the same shape, but the tube purple, and the segments having a purple stripe running through them: the stamina are also purple; it is however more beautiful than that plant. This is a native of the East Indies.

Culture.—In all the different sorts, the propagation is performed by the small bulbs or offsets that are removed from the sides of the old roots every year at the time they are transplanted. Some of the sorts, as the first and

second, are often capable of being raised on dry warm borders; but most of the others stand in need of artificial heat to raise them in the most perfect manner.

They all delight in a loose, sandy, dry soil, that contains a good proportion of vegetable mould; and require but little water, except where the roots are in a high state of growth and sending forth their flower-stems; when they should have it frequently in small quantities. When applied under other circumstances, it is apt to rot and destroy the bulbs.

All the more tender sorts should be put in pots, and placed in stoves, where they must be constantly kept; as much air as possible being admitted to them during the hot summer months. Some of them are, however, capable of bearing the open air at this season: but in this method of management they neither grow so well, or flower so regularly, as in the stove mode of treatment.

The most suitable season for transplanting the roots of all the different species, is at the time when their leaves are wholly destroyed, as about the latter end of July, or the beginning of the following month, before they begin to send forth new root-fibres, as after that has taken place they are liable to be greatly injured by being removed from their situations.

The first kind, or Yellow Autumnal Amaryllis, is a hardy plant, and may be increased with great facility by offsets from the roots. The best season for transplanting the root-bulbs of this sort is any time from May to the end of July, when their leaves are decayed: but after that period it will be too late to remove them, as they mostly begin to push out fresh root-fibres about the middle of August or sooner, if the season be moist and warm, frequently flowering the beginning of September; so that, if the business of transplanting be performed so late as this, it will spoil their flowering. This plant is capable of growing in any soil or situation; but it thrives to the best advantage in those of the above kind, when sufficiently fresh and light, and in open situations, that are not under the dripping of trees, or too near walls, or other tall fences that produce much shade. Miller observes that it is commonly known to gardeners by the name of Yellow Autumnal Narcissus; and usually sold by them with *Calchicum* for autumnal ornaments to gardens; for which purpose it is a pretty plant, as it will frequently keep flowering from the beginning of September to the middle of November, in case the frost is not so severe as to destroy the flowers; for though there is but one flower in each cover, a succession of flowers is produced from the same root, especially when they are suffered to

remain three or four years without being removed.

A dry warm border is the best exposure for this sort.

The second species, or Atamasco Lily, is also so hardy as to thrive in the open air in this climate, when the root-bulbs are planted out in a warm situation and on a dry soil: it is likewise best propagated by offsets from the root-bulbs of the old plants. As very severe frost is liable to destroy the bulbs in some cases, a few should always be planted in pots, in order that they may be protected in the winter season.

The third sort, or Jacobaea Lily, is of the more tender kind, but is now become common in the gardens of the curious in this country. The root-bulbs send forth plenty of offsets, especially when they are kept in a moderate warmth in the winter season: for the roots of this kind will live in a good greenhouse, or they may be preserved through the winter under a common hot-bed frame; but in this way they do not flower so often, or send out so many offsets, as when they are placed in a moderate stove in that season. This sort produces its flowers two or three times in the year: it is not however regular to any season; but the flowers are mostly produced from March to the beginning of September, when the roots are in a vigorous state of growth. It is best propagated by offsets from the old root-bulbs, which may be taken off every year: the most proper time to part and shift the roots in this kind is in August, as by this means they may take good root before the winter sets in. In doing this care should be taken not to break off the fibres from their roots. They should be planted out separately in pots of a middling size, and be kept in a moderate degree of warmth in the stove, as by that means they produce their flowers in greater plenty, and the roots make a greater increase, than where they are managed in a more hardy manner.

The fourth sort, or Mexican Lily, is not so hardy as either the above or the Belladonna Lily; it must of course be placed in a stove of much greater warmth; and if the pots are plunged into a hot-bed of tanner's bark, the roots will thrive better, and the flowers be stronger.

It is increased by offsets from the old root, in the same manner as the other sorts, and usually flowers in the beginning of the spring, when it produces a fine appearance in the stove with others of similar growths.

The fifth species, or Purple-flowered Amarillis, is likewise of the tender kind, and is capable of being propagated in the same manner as the above. It also succeeds the best, and flowers to the greatest advantage and effect, when con-

stantly kept in the stove in a similar degree of temperature with that of the above species.

The sixth kind, or Belladonna Lily, is more hardy. It has been cultivated, according to the editor of Miller's Dictionary, with great success in the following manner:—A border was prepared close to a wall which had a south-west aspect, about six feet in width, in this manner. All the earth to the depth of three feet was removed, and some very rotten dung put in the bottom six inches thick, upon which light garden mould was applied, about twenty inches in depth. After making this level, the roots were placed at six inches distance every way, being then covered over with light sandy earth, to the height of the border; by which means the upper parts of the roots are five or six inches buried. In the winter season the border was covered all over with rotten tanner's bark, to the depth of three inches, in order to prevent the frost from penetrating the ground. And when it proved very severe, some mats or straw were laid over the leaves to protect the plants from being destroyed. In this management the roots have greatly increased and the plants have constantly flowered every year; some of them having put out two or three stems which grew near three feet in height, producing many flowers in each umbel, which made a fine appearance during the month of October. It is added, that the green leaves come up soon after, and abide all the winter and spring until June, at which time they decay. Soon after this period the roots should therefore be transplanted; for, if they are suffered to stand till July, they will have sent forth new root-fibres, in which state it would greatly injure the roots if they were disturbed. If some of the roots be planted in a warm border close to a south wall, and in a dry soil, they mostly thrive well, especially if they be covered in severe weather; and these roots generally flower much stronger than those which are kept in pots, and multiply faster than under other circumstances.

The seventh species is more tender than the above, as it rarely puts forth offsets from the roots. But as it produces ripe seeds in sufficient quantity, it may be propagated in that way without much difficulty. These should be sown in pots of good mould in the spring season, and immediately afterwards plunged into a bark bed of moderate temperature, a little water being occasionally given till the plants appear, and become of sufficient growth to be transplanted out into separate pots, which should be performed in a careful manner, and a little water given immediately afterwards, the pots being directly placed in the stove, where they are to be constantly kept, as in the above kinds.

The eighth sort is likewise tender. It requires to be treated in the same manner as the *Jacobæa Lily*. It is found to increase pretty fast by offsets. When properly managed, it usually flowers in the winter season, especially if the pots be placed in a stove of moderate temperature; and as at this period there are but few flowers in the open air, it is more valuable on that account as an ornamental plant for the stove.

The ninth species is still more tender: it must of course be placed, during the winter season, in a stove where there is a moderate share of warmth; but it should not have so much water as the *Jacobæa Lily*. It may be raised from offsets.

The tenth species, or *Guernsey Lily*, is supposed to have come originally from Japan; but has been long cultivated in the gardens of *Guernsey* and *Jersey*; in both of which it seems to thrive and succeed as well as if it were in its native soil. From those islands its roots are annually sent to the curious in different parts of Europe.

The root-bulbs are generally sent to us in June and July; but the sooner the bulbs are taken out of the ground, after their leaves decay, the better they are; for though the roots, which are taken up when their flower-stems begin to appear, may flower, their flowers are not so large, or their roots so good afterwards, as those which are removed before they have sent out fresh root-fibres.

On obtaining the roots, they should be planted in pots filled with fresh, light, sandy earth, well mixed with a little very rotten dung, to the depth of two or three inches, and then placed in a warm situation; or what is better, in a moderate stove-heat, the earth being refreshed with water occasionally; but they should not have too much, as it would rot their roots, especially before the stems rise. About the middle of September, the more vigorous roots will begin to show the buds of their flower-stems, which are commonly of a red colour; therefore these pots should be removed into a situation where they may have the full benefit of the sun, and be sheltered from wet, and strong winds; but by no means too near a wall, or under glasses, which would draw them up weak, and render them less beautiful in their blow. At this season they should be gently refreshed with water occasionally, when the weather is warm and dry.

As soon as the flowers begin to open, the pots should be removed from the open air, to prevent the flowers from being injured by too much moisture; but they must not be kept too close, or be placed in situations too warm, as they would occasion their colour to be less lively, and hasten their decay. The flowers of this plant often

continue in beauty, when managed in the above manner, a full month: and though they have no scent, from the richness of their colour, they are justly esteemed as flowery ornamental plants.

When the flowers are decayed, the leaves begin to shoot forth in length, and, if sheltered from severe cold, continue growing all the winter season; but they must have as much free air as possible in mild weather, and be covered only in severe rains or frosts; for which purpose a common hot-bed frame is the best, as the glasses may be taken off constantly every day in dry open weather, which will encourage the leaves to grow strong and broad; whereas, when they are placed in a greenhouse, or not exposed to the open air, they are apt to grow long and slender, and have a pale weak aspect, by which the roots become weak, seldom producing good flowers.

The roots should be transplanted every fourth or fifth year, about the latter end of June or beginning of July, into fresh earth; but not oftener removed, as that would retard their flowering.

The offsets may also be taken off, and planted out into different pots; which, in three years time, mostly produce flowers. Consequently, after a person is once stocked with these roots, he may increase them, so as to have a constant supply of blowing roots, without being at the trouble or expense of sending to the above places annually for them; and the roots, thus preserved, will flower stronger than those which are brought from thence, as the inhabitants of those islands are not very curious in cultivating them;—their usual method, according to Miller, being to plant them at a great distance in beds of common earth, where they let them remain for many years; in the course of which they produce such a number of offsets that one single cluster has frequently contained above a hundred roots; by which means those which grow on the inside are so much compressed by the outer roots, that they are perfectly flattened: and from the number of roots growing in each cluster, they are all rendered weak, and unfit to produce such large stems of flowers as those which have grown singly and are of a spherical form. As when a person is possessed of a great number of these roots, it will be troublesome to preserve them in pots, a bed should be prepared in the following manner, in some well sheltered part of the garden. In doing this, a third part of fresh virgin earth, from a pasture ground, which is light, should be provided, with an equal portion of sea-sand, to which should be added rotten dung and sifted lime rubbish, of each an equal quantity. With this earth, when well mixed and incorporated, a bed should be made about two feet thick, raising it about four or five inches above the surface of the ground,

where the situation is dry; but where the ground is wet, it should be raised eight or nine inches higher. In this bed, about the beginning of July, as before directed, plant the roots about six or eight inches asunder each way; and in the winter, when the frost begins, cover the bed with a frame, or arch it over, and cover it with mats and straw, to prevent their leaves from being pinched by cold. In the spring, the covering should be entirely removed, and the bed kept constantly clean from weeds during the summer, stirring the surface of the earth now and then; and annually, when the leaves are decayed, sift a little fresh earth over them, to encourage the growth of the roots.

The roots may remain in these beds until they are of sufficient strength to produce flowers, at which time they may be taken up and planted in pots, as before directed, or be suffered to remain in the same beds to flower. These plants do not flower again the succeeding year, as in many other sorts of bulbous-rooted plants; but where the bulbs contain two buds in their centres, as is often the case, they frequently flower twice in the course of about three years; after which the same individual root-bulb does not flower again in several years; but this is performed by the offsets, which are taken from it at different times.

The eleventh species, or Ceylon Lily, is of a tender nature, and must be treated in the same manner as the Mexican Lily. It is not common in the gardens in this country, as it is a plant which increases but slowly by offsets from the roots. It usually flowers in June and July; and sometimes the same plant will produce flowers again in autumn if the pots be plunged into a bed of tanners' bark; but the flowers are seldom of long duration or great beauty.

The twelfth species is also of the tender kind, but may be increased by offsets from the roots, or by the bulbs which succeed the flowers. It should be treated in the same manner as is directed for the Crinum; the proper culture of which may be seen under that head.

All these bulbous-rooted plants, as being both curious and ornamental, deserve to be cultivated; those of the more tender kinds affording much variety in the stove or greenhouse; while the more hardy sorts produce a pleasing effect in the fronts of beds or borders in the garden or pleasure-grounds.

AMBER TREE. See *ANTHOSPERMUM*.

AMBROSIA, a genus comprising different plants, chiefly of the herbaceous kind.

It belongs to the class and order *Monœcia Pentandria*, and ranks in the natural order of *Compositæ*.

The characters are: that the male flowers are compound: the calyx is a common, one-leaved, flat perianthium, of the same length with the floscules: the corolla compound, uniform, tubulous, equal, and hemispherical: proper, one-petalled, tubulous, funnel-shaped, erect, quinquefid: the stamina have very small filaments: antheræ erect, parallel, and acuminate: the pistillum has a filiform style, of the length of the stamina: the stigma is orbiculate and membranaceous: the receptacle is common, scarcely any, naked. The female flowers are below the males, and double: the calyx is a one-leaved, acuminate, entire, permanent perianthium; the belly five-toothed, and one-flowered: no corolla: the pistillum is a germ ovate in the bottom of the calyx: the style filiform, of the same length with the calyx: stigmas two, setaceous, long, and divaricated: the pericarpium is a subovate nut, formed from the calyx, hardened, one-celled, not opening, crowned with the five acuminate teeth of the calyx: the seed single and roundish.

The species chiefly cultivated are: 1. *A. elatior*, Tall Ambrosia; 2. *A. arborescens*, Tree Ambrosia; 3. *A. maritima*, Sea Ambrosia.

The first species, or Tall Ambrosia, rises from two to three feet in height, upright and branched. The leaves are bipinnatifid, with a very long point, nerved, wrinkled, somewhat hirsute: the racemes composed of opposite branches, from four to six inches in length, lax, and rather erect. The male flowers are more numerous, approximating, and nodding: the perianthium is common, five-toothed, cup-shaped, with very minute florets in it: proper, extremely small, five-cleft: the corolla five-parted, the size of the calyx, with ovate, acute segments: the filaments are five: the antheræ are oblong; the rudiment of a pistil: five or six smaller flowers in the ray: their calyx five-cleft: their corolla consisting of five linear petals, no pistil, germ, or pericarp, but an upright, thick, pellucid style, with a pencil-shaped stigma. The female flowers are fewer, sessile, from three to six, and aggregate: the calyx none, except the minute lanceolate leaflets between the germs: the germ oblong, angular: the style two-parted: the stigmas recurved and simple.

This is an annual herbaceous plant. It is a native of Jamaica; and flowers with us in July and August.

The second species grows to the height of ten or twelve feet, with a woody stem, dividing into several branches: the leaves are hairy, composed of several winged lobes, placed alternately: the spikes of flowers are single, hairy, and produced at the extremities of the branches. The female flowers grow in small separate clusters very distinct.

The third species rises about two feet and a

half high: the stems are hairy: the leaves very soft and pubescent; and, upon being handled, emit a strong odour: the spikes of flowers are axillary: the racemes close: the male flowers sessile: the spike not sitting on a long peduncle, as in the above sort.

Culture.—These plants are raised either from seeds or cuttings, according to the kinds. The soils most adapted to their culture are those that are of the more poor, but moist sort.

The plants in the first species are capable of coming up and thriving well in the open air in this climate; but when so raised do not produce good seeds, unless the season be warm: therefore to have them good every year, it is necessary to cultivate them in a different manner. They should be sown on a moderate hot-bed in March; and when the plants are come up two inches high, be transplanted into another moderate hot-bed, allowing each plant three or four inches square; taking care to water and shade them pretty well, until they have taken new root: they should afterwards have a large share of fresh air every day, when the weather is warm, and frequent waterings, as they are thirsty plants. When the plants are grown pretty strong, they may be taken up with balls of earth to their roots, and be planted in large pots filled with light earth; and if they are then placed on a very moderate hot-bed, till they are perfectly rooted, it will greatly forward their flowering. About the latter end of May, they should be placed in the open air with other hardy annual plants.

The second species is capable of being propagated either by cuttings or seeds; if by the former, they should be planted in a shady border in any of the summer months, and be frequently watered. In about a month or five weeks they will generally have formed good roots, and should then be taken up and potted; as when they are left longer in the open ground they are apt to grow too luxuriant, and not so soon recover their removal.

This sort is hardy enough to be exposed to the open air in summer; and in winter, if sheltered in a common greenhouse, it will live several years. In mild winters, the roots live in the full ground, in a warm border, but in severe frosts the plants are in danger of being destroyed.

As the seeds, when sown in the spring, seldom come up the same year, the autumn should be preferred, as they will then come up in the following spring.

As the third sort seldom perfects its seeds in this climate, unless the plants are brought forward by heat in the spring, they should be sown in the autumn in a warm border; and when the plants come up in the spring, be transplanted in-

to another warm border of poor ground; as when they are put into rich moist land, they grow too luxuriantly, and do not flower till late in the season. The best method to obtain good seeds is to plant some of them in lime-rubbish. The seeds of this sort are also capable of rising spontaneously. This is not a plant that possesses much beauty; but it may be admitted into gardens or other places for the sake of variety.

All these plants may be employed for the purpose of ornament in beds, or the borders of pleasure-grounds.

AMELLUS, a genus comprehending perennial exotic plants of the Star Flower kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositae Oppositifoliae*.

The characters of which are: that the calyx is common, imbricate and roundish: the scales linear and pressed close: the compound corolla is radiate: the corollets hermaphrodite, very many in the disk: females very many in the ray, proper; of the hermaphrodite tubulous, five-cleft: female ligulate, lax, two or three-toothed: the stamina in the hermaphrodites have five capillary, short filaments: the anther is cylindrical and tubulous: the pistillum in the hermaphrodites has an obovate germ: the style filiform, of the length of the stamina: the stigmas two, and filiform: females very like the hermaphrodites: no pericarpium: the calyx unchanged: seeds to the hermaphrodites solitary, obovate: down capillary: to the females very like the others: the receptacle chaffy.

The species cultivated are: 1. *A. lychnitis*, Trailing Amellus, or Star Flower; 2. *A. umbellatus*, Umbelled Amellus, or Star Flower.

The first of these species rises with a round, bushy, trailing stem, from two to three feet in height, sending out branches on every side, terminated by flower-stalks, each supporting one violet-coloured flower, with a yellow disk, shaped like those of the Aster; and appearing in July or August. The leaves are quite entire, sessile, roughish. The peduncles terminal, with one or two leaflets. It is a native of the Cape of Good Hope.

The second has upright, simple, round, hairy stems, two feet or at most two feet and a half in height. The leaves at first radical; but afterwards each stem is naked at bottom, petioled and wedge-shaped at the base; somewhat decurrent and serrate, nerved, smooth, dark green, white and soft beneath. The upper stem-leaves are on shorter petioles, and smaller. The stem towards the top is generally divided into three branches; each of which is subdivided into many small flower-branches, forming a sort of umbel.

The umbellules have from three to eight flowers, with linear leaflets, from two to four, under them. The peduncles an inch long, each sustaining one large yellow flower. The scales of the calyx are lanceolate, membranaceous, and hoary. The hermaphrodite corolllets fewer in the disk, funnel-shaped, with a reflex border: the females in the ray numerous, linear, blunt, and bifid. The seeds to all the flowers are obconical. The down sessile, simple, and hairy. The receptacle hirsute, not bristly. It is a native of the island of Jamaica.

Culture.—These plants may be propagated either by cuttings or seeds, according to the kinds. In the first species it is best effected by cuttings made from the young shoots, which should be planted out in the early summer months on a bed of good earth, or in pots filled with good fresh mould, the earth being closely pressed round them. In either method a shady situation should be chosen; and in the former the young plants must be taken up with large balls of earth about their roots, and placed in pots of rather small sizes, in order that they may be more conveniently put in situations to be protected during the winter season. The plants mostly however succeed best when set out at first in pots, especially where proper attention is bestowed in giving them slight waterings occasionally, till they have stricken roots. If placed in a greenhouse, or common frame, of sufficient height, the plants will be prevented from being drawn up weak; and have more beauty, especially if plenty of sun be admitted when the weather is mild.

The second species is best raised by sowing the seeds in the early spring months, on a moderate hot-bed, covered two or three inches deep with fine sifted mould. When the plants are become sufficiently strong, they should be taken up and replanted in pots, two or three in each, a very little water applied, and the pots then plunged in a hot-bed of tanner's bark in the stove. In this method ripe seeds may be procured from them in the autumn: but where this mode of culture is not followed, the assistance of a stove in the winter season will be absolutely necessary.

The first sort may be employed in the garden or pleasure-ground as ornamental plants; and the latter, as being more tender, may serve for variety in the greenhouse or stove.

AMERICAN EARTH-NUT. See ARACHIS.

AMERIMNUM, a genus comprehending plants of the exotic perennial shrub, and shrubby tree kinds, which are of tender growth.

It belongs to the class and order *Dialedphia Decandria*, and ranks in the natural order of *Papilionaceae* or *Leguminosae*.

The characters of which are: that the calyx is a one-leafed perianthium: the tube bell-shaped, five-toothed, the teeth sharp: the corolla papilionaceous: standard with an oblong claw, roundish, heart-shaped, expanding, and convex: wings lanceolate, shorter than the standard, and the keel short: the stamina have ten filaments, conjoined: antherae roundish: the pistillum has a germ, pedicelled, oblong, compressed, leafy, and varicose, with lateral veins, within woody, not gaping: the cells disposed longitudinally within: the seeds solitary, kidney-shaped, thicker at the base, appendicled at the top.

The species are: 1. *A. Brownei*, Browne's Amerimnum; 2. *A. ebenus*, Prickly Amerimnum or Jamaica Ebony.

The first species is a shrub which rises commonly to the height of ten feet, and supports itself upon other shrubs. It divides into long, round branches, covered with a blackish bark, subdividing into a great number of alternate twigs. The leaves are quite entire, sharp, and shining, two or three inches in length. The common peduncles sustain about ten flowers; which are small, white, and have a very sweet scent. They come out in great abundance after the rainy season. The standard of the corolla, after fecundation, becomes erect; but before that takes place it spreads out wide. It is a native of the West India Islands, &c.

The second is a shrubby tree with a pretty thick stem, which rises twelve or fourteen feet high, covered with a rugged brown bark, and divides into many spreading branches, which grow almost horizontal; and are armed with short brown crooked spines. The leaves are small, stiff, and wedge-shaped, coming out in clusters, and sit close to the branches. The flowers come out upon slender foot-stalks from the side of the branches singly, and are of a bright yellow colour, being succeeded by compressed moon-shaped pods, which inclose a kidney-shaped seed.

Culture.—The first of these plants is capable of being raised by cuttings from the young twigs, which should be placed in pots of good mould in the early summer months, being then plunged into a good bark hot-bed, and very slight waterings occasionally given them. After the plants have taken root, they may be removed into the stove or greenhouse; and be managed in the same manner as is directed for the second kind.

The second species is best propagated by seeds, which must be procured from the places of its natural growth, as the plants do not produce seeds in this climate. They should be sown in pots filled with light fresh earth, in the early

spring months, and plunged into a good hot-bed of tanner's bark, or placed in tan, under pots, as their covers are very hard. The plants mostly appear in about six weeks, when they must be carefully treated, being very tender in their early growth; they should have fresh air admitted to them every day when the weather is warm, and be frequently refreshed with water when the earth in the pots becomes dry. In the course of five or six weeks after the plants appear they will be fit to transplant; in doing which, they should be carefully taken out of the pots and separated, planting each into a small pot filled with light rich earth, plunging them again into the hot-bed, carefully shading them from the sun daily, until they have taken root; after which they may be treated in the same manner as other very tender exotics, by giving them fresh air every day in warm weather, and watering them once in two or three days gently; and when the nights are cold, covering the glasses with mats. In this hot-bed the plants may remain till autumn, when they must be removed into the stove, and be plunged into the bark-bed.

At this time those plants whose roots have filled the pots should be carefully shifted into larger ones, before they are thus plunged; but as the plants are not of quick growth while young, they do not require to be often shifted out of their pots.

Through the whole of the winter season the plants must be kept warm, especially the first year, and have but little water, which in cold weather should be given in very small quantities. In case their leaves should be attacked by insects, they must be washed with a sponge to clear them, otherwise the plants will be much injured in their growth, and become unhealthy.

As these plants are very tender while young, they will not live in the open air in this climate, even in the warmest part of the year. They must of course be constantly kept plunged in the bark-bed, in the stove; in the summer season, when the weather is warm, admitting a large share of fresh air to the plants. In the second year, when the plants have attained sufficient strength, they may however be exposed for two or three months in a warm situation in the summer season.

According to Dr. Browne, the last sort is very common in Jamaica, and other places in the West Indies, where the wood is cut, and sent to this country under the title of *Ebony*, though it is not the true ebony, which is a native of the eastern country, and a plant that belongs to a different genus. The wood of the American Ebony is of a fine greenish brown colour, and polishing very well is in much esteem by the instrument-makers. It is of a very hard

durable nature: but the small dimensions of this tree render it fit only for few purposes; the trunk seldom exceeding three or four inches in diameter. The slender branches, being very tough and flexible, are frequently used for riding-switches.

These plants may be cultivated for the sake of curiosity and variety, among greenhouse and stove collections.

AMETHYSTEAE, a genus comprising a hardy annual plant of the flowery kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leafed perianthium: the tube bell-shaped angular, semiquinquefid, subequal, acuminate, and permanent: the corolla is one-petalled, ringent, little longer than the calyx: border five-parted, subequal: upper lip erect, rounded, concave, two-parted, gaping; lower three-parted, the sides rounded, erect, shorter; the middle quite entire, concave, the length of the upper lip: the stamina have filiform filaments, approximating under the upper lip, and longer than it: the antheræ simple and roundish: the pistillum is a quadrifid germ: the style the size of the stamens: stigmas two, and acute: no pericarpium; but the calyx becomes more bell-shaped and spreading: the seeds are four, shorter than the calyx, obtuse, and angular within.

The only species is the *A. cærulea*, or Blue Amethysteae.

It is a plant that has an upright stalk, which rises about a foot high: towards the top it puts out two or three small lateral branches, with small trifid leaves, sawed on their edges, of a very dark green colour. At the extremity of the branches the flowers are produced in small umbels, and are of a fine blue colour, as are also the upper part of the branches, and the leaves immediately under the umbel; so that although the flowers be small, from their colour, with that of the upper part of the stalks, the plants make a pretty appearance, during their continuance in flower.

The seed, when sown in the autumn, produces plants the following spring, which flower the beginning of June; but that which is sown in the spring does not flower till July. It is a native of Siberia.

Culture.—The propagation of this plant is effected without much difficulty by means of seed, which should constantly be sown in the autumn, as when this is deferred till the spring the plants do not flower so early in the summer, if at all; for where the season has proved dry they have been known to remain in the ground a whole year

without vegetating. As the plants do not succeed on being transplanted; the seeds should always be sown in places where they are to remain and flower, where the soil is rather inclined to be moist, or in pots filled with such sort of earth. After the plants have risen to some size, they should be thinned out when they stand too closely together, and be kept perfectly clear from weeds. In dry seasons water should be given them pretty frequently in slight proportions.

This is a plant that may be employed in the fronts of borders in gardens or pleasure-grounds, or to be set out in pots with others of the more hardy annual kind.

AMOMUM, a genus comprehending several tender, herbaceous, exotic plants of the Ginger kind.

It belongs to the class and order *Monandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters of which are: that the calyx is a one-leaved perianthium, cylindraceous, and unequally trifid: the corolla is monopetalous and funnel-shaped: the tube cylindraceous; the border three-parted, the parts oblong and spreading: the nectary two-leaved or two-lipped; the lower lip inserted under the upper segment of the corolla, spreading, almost erect, entire or three-lobed: the stamina have no filament except the upper lip of the nectary, which is smaller than the lower, and opposite to it, acuminate, or three-lobed at the tip; along the middle or at the end of which grows longitudinally a large oblong anther, geminate, or divided by a longitudinal furrow into two, which are one-valved: the pistil has an inferior, oblong germ: the style filiform, drawn through the suture of the anther; the stigma turbinate, obtuse, and ciliate: the pericarpium a fleshy capsule, ovate, three-cornered, three-celled, and three-valved; the seeds are several, covered with a sort of berried aril.

The species chiefly cultivated in stoves in this climate are: 1. *A. Zinziber*, Common or Narrow-leaved Ginger; 2. *A. Zerumbet*, Broad-leaved Ginger; 3. *A. Cardamomum*, Cardamom.

In the first species the root is creeping, bipalmate, compressed; the fleshy tubers with age becoming fibrous. The culm annual, two feet in height, quite single, solid, and upright. The leaves are half a foot in length, smooth, narrow, alternate, on short embracing petioles. The scape separate, eight inches in height, thick, round, straight, scaly, and usually without leaves. The spike is upright, composed of large, ovate, subacuminate, coloured scales, half closing the flowers, which are of a blue colour. The calyx is a small, double spathe. The corolla yellowish green, with a long, slender tube; the segments of the border

conical, and nearly equal. The nectary is reddish brown, ovate, quite entire, petal-shaped, winged on each side at the base, somewhat shorter than the corolla, fastened to it below the anterior fissure of the segments. The filament (upper lip of the nectary) filiform, placed on the corolla, and shorter than it. The anther ovate, large, cloven longitudinally, embracing the filiform style. The stigma cylindraceous, and ciliate at the tip. The capsule smooth, containing many oblong seeds. It is a native of the East Indies, and flowers here in September.

The second species, or Broad-leaved Ginger, has the tubers of the root much larger, round, twisted, thick, branched, horizontal, pale-coloured, with but little smell, and a bitterish, not an ardent flavour like true Ginger. The culm four feet in height, perennial, straight, quite simple, round and solid, like the above species. The leaves are lanceolate, large, smooth, petioled, embracing, ascending obliquely. The scape a foot high, distinct, thick, scaly, red. The spike large, with rounded, close, one-flowered, red scales. The flowers of a white colour. The calyx a single acute spathe. The corolla pale, with a long tube: the upper segment of the border acute, the two lower ones subovate. The nectary of the same colour, petal-shaped, very blunt, bifid, fastened to the throat of the corolla. The filament flat, subulate, bent in, adhering to the hinder segment of the corolla, and nearly equal to it. The anther oblong, fastened to the middle of the filament. It is a native of the East Indies, and flowers here from September to November; when the stalks perish in the same manner as in the true Ginger.

The third species, or Cardamom, has thick fleshy roots, resembling those of the large Flag Iris; which in the spring send forth many green reed-like stalks, which rise to the height of seven or eight feet, garnished with very long narrow leaves, set alternately, closely embracing them at their base. The stalks decay entirely in autumn, and new ones arise from the roots in the spring, but it has not yet produced any flowers in this climate; though the roots thrive and increase greatly where they are managed in a proper manner.

According to Dr. Browne, the manner of preparing the Ginger root for use in the West Indies is this: When the stalks are wholly withered and the roots taken up, which is generally done as soon afterwards as possible, after being picked and cleared, they are gradually scalded in boiling water; they are then spread, and exposed to the sun till the whole is sufficiently cured; when they are divided into parcels of about one hundred weight each, and put into bags for the market; this is called black ginger. The white ginger is

never scalded, but every root is picked, washed, and scraped separately, and then dried in the sun and air very carefully.

In order to preserve this root in syrup, it is dug when the shoots do not exceed five or six inches in height. Being picked and washed, they are scalded till tender: then put into cold water, scraped and peeled gradually: this operation lasts three or four days, during which time the roots are constantly kept in water and frequently shifted. They are then put into jars, and covered with a thin syrup, which after two or three days is shifted, and a richer put on; this is sometimes again removed, and even a fourth put on; but it seldom requires more than three syrups. The shifted syrups are diluted, and fermented into a small pleasant liquor, called cool drink, which is in much use.

Culture.—These plants are easily propagated by parting their roots; which should be performed in the spring, before they put out new shoots; as they should not be transplanted in summer, when they are in full vigour, nor do they succeed well when they are removed in autumn, as they remain long after in an inactive state; and during that time, if wet stagnates about the roots, it often causes them to rot and be destroyed. When the roots are parted, they should not be divided into too small pieces, especially if they are designed to have flowers; as until the roots have spread to the sides of the pots they rarely put out flower-stems, for which reason they should not be planted in over large pots.

They thrive best in a light rich earth, such as is met with in the kitchen-garden; with this the pots should be filled within two inches of the tops, then the roots placed in the middle of the pots, their crowns upwards, the pots being immediately filled up with some of the same rich earth: after this they should be plunged into a hot-bed of tanner's bark, and be sparingly watered, until their stalks appear above ground, when they will require a greater share of moisture, especially during the warm summer months; but in autumn the waterings must not be often, or in great quantity at a time; and during the winter season, when the roots are inactive, but very little should be given them. The pots with these roots should constantly remain plunged in the tan-bed, as when they are taken out and placed on the shelves in the stove, the roots frequently decay from the shrinking of their fibres.

In the above method of culture, both these plants have been found to multiply rapidly, and produce fine large roots.

In the West Indies, the Ginger plant is found to succeed best in such soils as are rich and cool; but in those that are of a more clayey na-

ture the roots shrink less in scalding. The lands intended for the culture of this plant are first well cleared and hoed, then slightly trenched over. In this way they are made ready for planting, which is performed in March or April. The plants flower about September, and when the stems are fully decayed the roots are taken up. This is usually in January or February.

AMORPHA, a genus comprising a hardy deciduous flowering shrub of tall growth, and of the Bastard Indigo kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*, or *Leguminosæ*.

Its characters are: that the calyx is a one-leaved perianthium, tubulous, cylindrical, and turbinate: the mouth erect, five-toothed, obtuse, the two upper teeth larger than the others; permanent: the corolla composed of one ovate, concave petal, scarcely larger than the calyx, erect, inserted into the calyx, between the two larger and upper teeth, and placed at the upper side of it: the stamina have filaments very slightly united at the base, erect, unequal in length, longer than the corolla: the antheræ are simple: the pistillum has a roundish germ, subulate style, of the length of the stamina, and simple stigma: the pericarpium is a legume, lunulate, reflex, larger than the calyx, compressed, more reflex at the tip, one-celled, and tubercled: the seeds are two, oblong, kidney-shaped.

There is only one species, which is the *A. fruticosa*, Shrub Amorphia or Bastard Indigo.

It is a plant that rises with many irregular stems to the height of twelve or fourteen feet, with very long winged leaves, in shape like those of the Common Acacia. At the extremity of the same year's shoots the flowers are produced in long slender spikes, they are small and of a deep purple colour; make their appearance the beginning of July, but the seeds do not ripen in this climate. It grows naturally in Carolina, where a coarse sort of indigo was made from the young shoots, which occasioned its obtaining the name Bastard Indigo.

Culture.—This shrub is generally propagated by seeds, which are annually received from different parts of America; as it is found in many of the northern colonies. They usually arrive about February, and should be sown as soon as possible afterwards in a light soil. And it may also be propagated by laying down the young branches, which in one year make good roots, and may then be taken off, and planted either in the nursery, or the places where they are designed to remain. But if they are put into a nursery, they should not remain there more than one year: for, as the plants make large shoots, they do not remove well when they have remained

long in a place: they should have a sheltered situation, in order to prevent their branches being broken by the winds. As the shoots are large, soft, and tender, their upper parts are liable to be killed by the frosts in winter, but they put out new shoots in plenty below the dead parts the spring following in general.

From the tall growth of this shrub, and the beauty of its flowers, it may be employed with much effect in assemblage with others in forming extensive shrubberies, in which cases it should be set rather to the back parts of the borders or clumps.

AMYGDALUS, a genus comprising the Almond, Peach, and Nectarine, which are trees of the finer fruit kinds.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Pomaceæ*.

The characters of which are: that the calyx is a one-leaved perianthium, tubulous, inferior, quinquefid, deciduous; the divisions spreading, and obtuse; the corolla consisting of five petals, oblong, ovate, obtuse, concave, being inserted into the calyx: the stamina have about 30 filiform filaments, erect, shorter by half than the corolla, inserted into the calyx: the antheræ are simple: the pistillum has a roundish, villose germ: the style simple, of the length of the stamina: the stigma headed: the pericarpium is a roundish, villose, large drupe, with a longitudinal furrow: the seed is a nut, ovate, compressed, acute, with prominent sutures on each side, reticulate with furrows, and dotted with small holes. The nut of the almond is covered with a dry skin; that of the peach with a soft pulp.

The species chiefly cultivated in the first or Almond kind are: 1. *A. communis*, Common Almond Tree; 2. *A. dulcis*, Sweet or Jordan Almond; 3. *A. sativa*, White-flowered Almond Tree; 4. *A. nana*, Common Dwarf Almond; 5. *A. pumila*, Double-flowered Dwarf Almond; 6. *A. incana*, Hoary Dwarf Almond; 7. *A. orientalis*, Silvery-leaved Almond.

The first of these species, or the Common Almond, grows to the height of near twenty feet, with spreading branches. The leaves have much resemblance to those of the Peach; but the lower serratures are glandular, and proceed from buds both above and below the flowers, while in the Peach they proceed from the ends of the shoots, above and not below the flowers. The form of the flowers is not very different, but they come out usually in pairs, and vary more in their colour from the fine blush of the apple-blossom to a snowy whiteness. But the chief obvious distinction is in the fruit, which is flatter, with a coriaceous covering, instead of a rich pulp; opening

spontaneously when the kernel is ripe. The shell is less hard than in the peach, and is sometimes even tender and exceedingly brittle; it is flatter, smoother, and the furrows or holes are more superficial.

This tree is scarcely worth any thing for the fruit which it produces in this climate; but in some parts of Italy, and in the South of France, it is of much importance in this view, where there are vast plantations of it. It is a native of Barbary.

In the second, or Jordan Almond, the nuts have a tender shell, and a large sweet kernel. The leaves are broader, shorter, and grow much closer than those of the common sort, and their edges are crenate. The flowers are very small and of a pale colour, inclining to white. It is observed by the editor of Miller's Dictionary that he has several times raised these trees from the almonds which came from abroad, and always found the plants to maintain their difference from the Common Almond.

The third species has narrow sharp-pointed leaves; the flowers are much smaller than those of the Common Almond, and are white: the shoots of this tree are also smaller, and the joints closer than those of the common sort, nor is the tree so hardy: therefore it should have the advantage of a warm situation, or otherwise it will not thrive. This sort flowers early in the spring, but rarely produces fruit in this climate, except in very warm exposures.

In the fourth species, the leaves are scattered, subpetioled, lanceolate, but more attenuated towards the base, somewhat rigid, smooth, the serratures very sharp and even somewhat spinose. The stipules are linear, long, serrate-toothed, and deciduous. The flowers very abundant on the twigs, appearing with the first leaves from all the buds, either solitary or two together. The calyx is subsessile, reddish. The segments acute, green, very finely serrulate. The petals are of a fine rose-colour. The stamens about twenty, the inner ones gradually shorter; the filaments bowed a little and converging at the end. The pistil the length of the calyx, extremely villose. The fruit usually solitary, sessile, ovate, somewhat compressed, pointed by the shrivelled style, extremely hirsute with a harsh yellowish wool, the size of a hazel-nut. The coriaceous covering splits and falls off when the kernel is ripe; the nut is of a sharp ovate form, compressed, of a yellowish gray colour, grooved at the sutures; the kernel like that of the peach both in colour and taste. The wood of this little tree is hard, of a yellowish chesnut colour, and veined; but the trunk is seldom an inch in thickness. It varies very much in size, being in some places low and shrubby, scarcely attaining a span in

height; while in others, and in gardens, it grows a fathom in height. It blooms in April, at which time all the young shoots are covered with flowers, which are of a peach-blossom colour, and make a fine appearance. It is a native of the northern parts of Asia.

In the fifth the branches are smooth, two or three feet high, of a dark purple colour. The leaves are lanceolate, petiolate, veined, wrinkled, serrulate. The flowers are generally two to a bud, and sessile. The calyx is reddish; the petals emarginate, red, longer than the tube of the calyx. The filaments paler; germ and style pubescent at bottom. The stipules linear, very deeply serrate. Its native country is Africa.

It has varieties with double flowers. The single sort flowers the beginning of April, and the double is commonly three weeks later.

In the sixth species the bark is brown ash-coloured, and rough. The leaves scattered, frequent, sessile, lanceolate, narrowing towards the base, frequently and sharply serrate, edge a little bent in, furrowed or wrinkled above along the veins, which are very prominent underneath. The stipules bristly, sometimes toothed, permanent. The flowers are less than in the dwarf sort, solitary or twin, sessile at the branches among the leaves, and breaking out with them. The segments of the calyx much less than in the *nana*. The petals are of a pale rose-colour. The stamens about twelve, scarcely longer than the tube of the calyx.

Professor Martyn doubts whether this be any thing more than a variety of the fourth species.

In the seventh species, or Silver-leaved Almond, the leaves are silvery, and very like those of the Sea Purslane. They continue most of the year. The flowers are very small, but have not been yet succeeded by fruit in this climate. It is a native of the Levant.

In the second, or Peach kind, the only species cultivated is the *A. persica*, or Peach Tree.

This in its natural state of growth is a small tree, with spreading branches. The leaves larger than those of the Almond, lanceolate, alternate, smooth and serrate; the serratures short, sharp, and regular. The flowers are sessile and solitary; the calyxes reddish; the corollas bell-shaped, with a spreading border of a fine light purple or pale rose-colour, but with very little scent. The fruit is a roundish drupe, commonly pointed opposite to the peduncle, and with one longitudinal groove: the pulp is large, fleshy, and succulent, white or yellowish, sometimes reddish, abounding with a grateful sweet acid juice; the outside is of a pale greenish colour, with a bluish or tawny redness frequently towards the sun, and the skin is lanuginose or woolly: the stone

is very thick and hard, full of deep irregular furrows, and incloses a bitter kernel. The wood of this tree is of a reddish brown colour, darker towards the middle, and is fit for the use of the turner. It is of quick growth, but not of very long duration.

The original country of its nativity is not known, but it seems to have been obtained by the Romans from Persia.

The varieties that are in cultivation for the sake of the fruit are extremely numerous; those in most esteem, according to the editor of Miller's Dictionary and Mr. Forsyth, are the following:

The White Nutmeg Peach, which is small, but the juice sugary. It is chiefly esteemed as being first ripe. This is in eating in July, but soon grows mealy.—The Red Nutmeg, which produces larger and rounder fruit, is a great bearer, and valued for its early maturity. It is of a bright vermilion colour, and has a fine musky taste. This sort is held in much esteem, and ripens about the beginning of August.—The Early Avant, which has an agreeable flavour, and ripens in August, but is apt to be stringy in eating.—The Small Mignonne, which is very red on the side next the sun, the flesh having a rich vinous juice. It becomes ripe about the middle of August.—The Anne Peach, which is a fine early fruit. It ripens about the middle or latter end of August. It is said to have taken its name from Mrs. Anne Dunch, of Pusey, in Berkshire, where it was first raised.—The Royal George Peach, which comes in soon after the above, and in which the flower is large and white; the fruit of a dark red colour towards the sun, and full of a fine rich juice. It ripens about the latter end of August.—The Royal Kensington, which is one of the best Peaches that are cultivated. It is of a high red colour next the sun, and yellowish next the wall. This is a good bearer, and not liable to be blighted. The flesh is rich and juicy. It ripens about the latter end of August or beginning of September.—The Yellow Alberge is a peach of a tolerable size and good taste, but which should be perfectly ripe before it is gathered, otherwise it is not good for eating. It becomes ripe about the middle of August.—The White Magdalen, which is seldom high flavoured, unless it be forced; in which case it is excellent. It ripens about the middle of August, and has a very small stone.—The Early Purple, the fruit of which is large, of a fine red colour, and full of rich vinous juice. This is an excellent peach, and becomes ripe about the latter end of August.—The Large or French Mignonne, which is a beautiful large red peach, and has a sweet high-flavoured juice. It is one of the best French Peaches, and is ripe

L

the latter end of August.—The Bourdine has a pretty large fruit, of a fine red colour towards the sun; the juice being rich and vinous. It is a good bearer, especially when old, and the fruit is highly esteemed. It becomes ripe about the middle of September. It answers well as a standard, producing plenty of good fruit. The Chevreuse, or Belle Chevreuse, is a good peach: it is of a middling size, and beautiful red colour; the juice being rich and sweet. It ripens about the beginning of September, and is a plentiful bearer.—The Red Magdalen, which is large, and full of a rich sugary juice of excellent flavour. It is a good peach, and becomes ripe in the beginning of September.—The Early Newington, or Smith's Newington, which is of a beautiful red colour towards the sun; full of a sugary juice, and becomes ripe in the beginning of September.—The Montauban, which is of a deep red colour, inclining to purple, next the sun; but pale towards the wall. It has a fine melting flesh, with a rich juice; and is a plentiful bearer. It ripens in the latter end of August.—The Malta Peach is of a fine red colour next the sun; and has a white melting flesh. It is a good bearer; and the fruit ripens in the beginning of September.—The Noblesse is a large peach, of a bright red colour towards the sun: the flesh melting, and the juice very rich in good seasons. It is a good bearer; and the fruit ripens in the beginning of September.—The Old Newington Peach, which is of a fine red colour, has a high vinous-tasted juice; and is esteemed a good Pavie. It ripens about the latter end of September.—The Chancellor, which is one of the best sort of peaches, and of a fine red colour next the sun; the skin is thin, the flesh melting, and the juice very rich. It ripens about the beginning of September.—The Bellegarde Peach, or Gallande, is very large, and of a deep purple colour where exposed to the sun: the flesh melting, and full of a very rich juice. This is a fine peach, ripening about the middle of September.—The Lisle Peach is of a middling size, and of a fine violet colour next the sun: the flesh is melting, and full of a vinous juice; but adheres to the stone. It ripens about the middle of September.—The Rosanna, which is of a fine purple colour next the sun; and has a rich vinous juice. It is reckoned a good peach; and becomes ripe about the middle of September.—The Rambouillet, which is usually termed the Rumbullion, is pretty large, and of a fine red colour next the sun: the flesh is melting, and the juice vinous and rich. It ripens about the latter end of September.—The Admirable, which is a very large and beautiful peach, finely coloured with red towards the sun: the flesh is melting,

and the juice sugary, and of an exquisite taste. It ripens about the middle of September.—The Bellis, or La Belle de Vitry, has the fruit of a pale red towards the sun; the flesh being white, and adhering to the stone; but the juice vinous and rich. It becomes ripe in the latter end of September.—The Portugal, which is of a beautiful red colour towards the sun, and generally spotted; the flesh being firm and adhering to the stone, and the juice rich and vinous. It ripens late in September.—La Teton de Venus, or Venus's Breast, which is a middle-sized fruit, somewhat longish; the side next the sun being of a pale red, the flesh melting, and the juice sugary and rich. It ripens about the latter end of September.—La Pourprée, or Late Purple, which has the fruit large and of a purple colour: the flesh melting, and the juice sugary and rich. It ripens about the beginning of October.—The Nivette, which is of a bright red next the sun, and of a yellowish cast towards the wall: the flesh is melting, and full of a rich juice. It is an excellent peach, and ripens about the middle of September.—The Monstrous Pavie of Pomponne, which is very large, and of a round form; the flesh being white and melting, but adheres to the stone. It is of a fine red colour towards the sun. This ripens in the latter end of October.—The Catharine Peach is a fine large fruit of a round form, and beautiful red colour towards the sun: the flesh is melting, and full of a rich juice; but adheres to the stone. In this the pulp is improved by its lying three or four days before it is eaten. It ripens about the latter end of October; but there are not many situations where it is perfectly ripened. It is a plentiful bearer.—The Bloody Peach, which is of a deep red next the sun; the flesh having also a deep red cast. It seldom ripens in this climate without forcing; but is reckoned excellent for baking and preserving.—The Royal, or La Royale, which is a large round peach, of a deep red next the sun: the flesh is melting, and full of a rich juice. It ripens in the latter end of September.—The Cherry Peach, or Pêche-cerise, which is small and globular; but of a beautiful red colour towards the sun, and of a whitish wax colour on the otherside. This colour, which resembles that of the Pomme d'Api, gives this little peach a beautiful appearance. The flesh is melting, and the juice has a tolerably good flavour. On a dry soil and good exposure it ripens about the beginning of October.—Grimwood's New Royal George, which is a high coloured peach, and of a fine flavour. It ripens in the latter end of August or beginning of September. It is probably the same as the Royal George.—The Superb Royal is a fine large peach, of a red colour to-

wards the sun, and pale on the other side. It ripens in September.—The Queen Charlotte, which nearly resembles the Small Mignonne; and ripens about the same time.—The Late Violet, which is esteemed a very fine peach, and ripens in September.—Lockyer's Peach is a fine handsome fruit, and ripens in September.

In addition to the above, Mr. Forsyth mentions others, as proper for cultivation, as: Allen's Royal; Bourdeaux; Buckingham Mignonne; Carlisle; Double Swalch; Double Montagne; Dwarf Orleans; Eton; Fairscot's; Ford's Seedling; Hemskirk; Incomparable; Lord Falconberg's Mignonne; Low's Large Melting; Malacotan; Millet's Mignonne; Pavie Admirable; Pavie Royale; Pêche de Pau; Ronald's Early Gallande; Sion; Smooth-leaved Royal George; Steward's Late Gallande; Vanguard; Violette Hative; White Blossomed; and the Double Blossom, which is highly useful as an ornamental plant.

Notwithstanding this extensive list, a few sorts are only recommended as worth planting, in Miller's Dictionary. These are the Early Purple; the Grosse Mignonne; Belle Chevreuse; Red Magdalen; Chancellor; Bellegarde; Bourdine; Rossanna; Rambouillet, and Nivette. But with these, other authors recommend the Small Mignonne; Early Newington; Noblesse; Admirable; Royal; Monstrous Pavie; Swalch, &c.

Where there is room, and the situation is warm, one or two trees of the Catharine Peach should have places; as in very warm seasons it is an excellent fruit.

As these sorts follow each other in the times of their ripening, they will be sufficient to furnish proper supplies of this fruit during the season: but as in some seasons there are particular sorts of peaches very good, which in other seasons often prove but indifferent; when there is a sufficient extent of walls, it may be advisable to plant three or four other sorts; as the Montauban; the Lisle; the Old Newington; La Teton de Venus, &c.

Mr. Forsyth thinks the following sorts best suited to small gardens: the Early Avant; Small Mignonne; the Anne Peach; Royal George; Royal Kensington; Noblesse; Early Newington; Gallande; Early Purple; Chancellor; Nivette; the Catharine; and the Late Newington.

Against walls that have a north or east aspect, he recommends the Early Avant; Early Ann; Early Mignonne; Royal George; Red Magdalen; Royal Kensington; Noblesse; Grosse Mignonne; and Millet's Mignonne.

For the purpose of being forced in the peach-house, the following sorts are considered as the most proper by the author of the Scotch Forcing

Gardener: the Red Magdalen; White ditto; Royal George; Grimwood's ditto; Noblesse; French Mignonne; Montauban; Teton de Venus; Early Purple; Late ditto; Orange; Hative; &c. Mr. Forsyth likewise advises the use of the Catharine Peach in this way, as possessing many advantages.

In France they distinguish those called Peaches into *Pavies* and *Peaches*; those being called Peaches which quit the stone; while those whose flesh closely adheres to it are termed Pavies. The last are much more esteemed there than the Peaches, though in this country the Peaches are preferred by many persons.

The sign of a good Peach is that of its having a firm flesh, the skin fine and thin; of a deep or bright red colour next the sun, and yellowish next the wall. The flesh of a yellowish colour, and full of high-flavoured juice; the stone small, and the pulp or flesh very thick.

The third, or Nectarine, though formerly considered as a distinct species from the great difference in the fruit from that of the Peach, is at present, on account of the different sorts of fruit having been produced on the peach-tree, esteemed as a variety of it. It is not capable of being distinguished from the peach either in its mode of growth, wood, leaves, or flowers, with any great degree of certainty; but the fruit is perfectly distinct in all the different stages of its increase and maturation; the skin or rind in it being smooth and firm, while in the peach it is covered with a soft downy substance. The flesh or pulp of the former is likewise much firmer than in the latter.

It may, however, be treated of separately for the sake of distinction in its culture.

The *A. Nucipersica*, or Nectarine Tree, is commonly a smaller tree than the Peach: the trunk and larger branches are covered with a lighter bark: the smaller branches or twigs are more tender, and inclining to red: the flowers are less than those of the Peach, and of a darker red colour. These differences are, however, frequently trifling, and by no means constant. The principal distinction certainly is in the fruit, which is smaller and rounder, without any lateral cleft. It has its name *Nucipersica* from the similitude of the fruit in smoothness, colour, size, and form, to the Walnut covered with its outer green shell; and the English name of Nectarine is deservedly given it, from the rich, racy, nectarious flavour of the fruit; which in its highest perfection is superior to any other European fruit, and perhaps to many boasted fruits of hotter climates.

There are several varieties that deserve attention for the purpose of cultivation: Fairchild's Early Nectarine, which is one of the earliest, is

a small round fruit, of a beautiful red colour, and well flavoured, that ripens about the middle of August.—The Newington Nectarine is a fine fruit, of a beautiful red colour next the sun, and yellow on the other side: its flesh adheres to the stone. It has an excellent rich juice, and ripens about the middle of September.—The Elruge Nectarine is of a middle size, of a dark red or purple next the sun, and of a pale green on the other side. It has a soft melting pulp, and vinous juice; becoming ripe in the latter end of August or beginning of September. It is said to have been first cultivated by Gurle, a Nurseryman at Hoxton, in the time of Charles the Second.—The Scarlet Nectarine has a fine scarlet colour next the sun, but is of a pale red next the wall. It ripens in the latter end of August, or beginning of September.—Brugnon, or Italian Nectarine, which is of a deep red next the sun, and a pale yellow on the other side; the flesh adhering to the stone. This has a rich flavour in good seasons, and ripens in the latter end of August, or beginning of September.—The Roman Red Nectarine is a large fruit, of a dark red colour next the sun, but of a yellow colour on the other side: the flesh adhering to the stone. When fully ripe it shrivels, the pulp being then replete with a rich juice. It becomes ripe in September. It is observed by Mr. Forsyth, that this Nectarine has a smooth leaf, and the Newington a jagged one; which is one of the most essential differences by which these two excellent fruits are distinguishable from each other.—The Murry Nectarine, which is of a reddish colour towards the sun, and of a pale green towards the wall. Its fruit has a tolerably good flavour, and ripens about the middle of September.—Temple's Nectarine is of a middle size, of a pale red colour towards the sun, and of a yellowish cast next the wall. Its fruit, when quite ripe, shrivels; the pulp being then full of rich juice of a fine flavour. It ripens about the middle of September or beginning of October.—The Golden Nectarine, which is a handsome fruit of a soft red colour towards the sun, and yellow on the other side: the flesh adhering to the stone. It has a rich flavour, and is ripe about the beginning of October. The Peterborough, or Late Green Nectarine, sometimes denominated the Vermash, is of a middle size and round shape, being always of a green colour: the flesh is firm, and in a good season tolerably well flavoured. It ripens about the middle of October.—The Violet Nectarine is of a middle size, and a purple colour next the sun, but pale on the other side: it has a vinous flavour, and ripens in the latter end of August or beginning of September.

In addition to this list, Mr. Forsyth has recommended Anderson's Nectarine; Aromatic; Black

Newington; Clermont; De la Taille; Early Pavie; Genoa; Luncomb's Black; Musk Violet; Newfoundland; New White; Princess Royal; Rogers's Seedling; Royal Chair d'or; St. Omer's; Tawny, ripe in September; White, ripe in August and September.

The best of these varieties, according to Miller, are: the Fairchild's; the Elruge; the Newington; the Roman Red; and the Temple; but especially the Newington and Roman. The White Nectarine is likewise a good fruit, and a curious variety.

And as a proper selection for a small garden, Mr. Forsyth recommends the Fairchild's Early Nectarine; the Elruge; the Scarlet; the Newington; the Red Roman; and the Murry.

For the purpose of forcing, Mr. Nicol advises the Roman; the Scarlet; Elruge; Newington; Temple; and the Duc de Tillo; the last is a Spanish Nectarine, and, of all others, ought, he thinks, to take preference. The fruit is of the most exquisite flavour, dark purple, a freestone; and grows to the size of a Noblesse Peach in the same house with it: and the tree is the most healthy and beautiful, and bears large and regular crops.

Culture in the Almond kind. The propagation of these trees is either effected by budding them upon plum, almond, or peach stocks, or by setting the stones of the fruit. But as by the first method they sooner form full and regular heads, and also more early attain to the state of flowering and producing fruit, it is that mostly practised; and if it be intended to continue any particular sort, it is only by this mode that it can be effected with certainty, as, where the trees are propagated from the seed, they are apt to vary, all the varieties proceeding frequently from the fruit of the same tree.

The operation is mostly performed about the latter end of the summer, as in August, and may be done either for dwarfs, half, or full standards. It is remarked by Mr. Forsyth, that in the spring, after being budded, they may be trained for standards, or suffered to grow for half standards; but the method generally practised, is to bud them at such heights as the stem is designed to be, and the second year afterwards to plant them out for good. If these trees are to be afterwards transplanted into a dry soil, it is recommended to be done in the month of October, when the leaves begin to decay; but if into wet ground, the month of February is to be preferred. In wet soils, such as are budded on plum stocks are found to thrive best, but those on almond or peach stocks succeed with the greatest certainty in dry ones.

In raising trees of this kind from the stones, the early autumn or spring months, as October

and November, or February and March, are the best seasons for planting them in, care being taken to select stones of the last summer's growth; they are best drilled into beds of good light soil, to two or three inches in depth. In the spring the plants will appear; and in the autumn or spring following they may be transplanted into the nursery, and be arranged in rows, according to the wish of the planter, for the purpose of being afterwards trained for standards, half standards, or dwarfs.

When it is intended to bud any of them with peaches or almonds, some of them will be in a proper state for the operation for dwarfs the first, and all of them the second year after being transplanted; but in order to be trained with proper stems for standards, they should invariably have three years' growth.

It is likewise easy to raise the dwarf sorts by suckers from the roots, and by layers, as well as by being propagated by budding upon the plum or almond-stocks. The best season for these operations is the latter end of summer or beginning of autumn.

Pruning.—The method most common for pruning trees of this sort is, to shorten the first shoot from the bud to a few eyes in the spring, in order that lateral shoots may be put forth by the trees in proper quantity, so as to form regular full heads. Mr. Forsyth advises, when young trees are brought from the nursery, never to cut them till the young shoots begin to break, as about April or May, strong trees being cut about a foot from the ground, and the weaker ones half the distance; but when the wood is not well ripened, as after wet autumns, hard winters are apt to kill the shoots: in such cases they should be cut down to the sound wood, taking care to prune out all such cross shoots as rub against others, the tree being left open in the middle, and the shoots cut about the same length as for apricots, and in proportion to their strength, always wholly cutting out and removing the decayed wood and cankered parts of the trees.

It is also recommended by the same practical author, that they be planted in sheltered situations, and such as have a southern aspect, whether used as standards or half standards. It may be necessary, in some cases, to protect them by a light covering of some kind, against the injury to be expected from the frosts in February and March; with dwarf trees this may be done by fixing up poles and thatching over them with fern, straw, or other similar substances, which may be removed when the frost is gone, and the weather fine and settled in the spring; by which a good supply of almonds may sometimes be procured. Sometimes trees of this sort are planted in espaliers, and against walls, in order to improve and render the fruit more early.

To preserve the fruit of the almond-tree it is necessary that it should be first properly dried, and then put into either bran or sand.

The larger sorts of these trees, from the beauty of their early blossom, may be employed with great effect in the back parts of the borders, or clumps of shrubberies and pleasure grounds, when properly intermixed with other kinds of flowering shrubby trees of tall growth. They are also highly ornamental when placed singly on lawns, or other open spaces near the house.

The great beauty of the dwarf sorts, when in blow, will be best displayed, and have the fullest effect, when they are arranged and blended with other low shrubs in the fronts of such borders and clumps.

Culture in the Peach kind.—In the propagation of peach-trees, it is necessary either to bud them upon plum stocks, or to set the seed: by the latter method most of the fine varieties of this fruit have probably been at first obtained; yet it is extremely uncertain of success, from their great tendency to deviate from the nature of the variety of the original seed. In the raising of new varieties in this method, it is best to set the seeds in drills two or three inches deep, in good mould, in the autumnal months, as about October or November; but when neglected at that season, they may be preserved in sand till February, and be then put in. In the ensuing spring the plants will be up; and after the growth of one or two years, according to the intention of the planter, they will be fit for being transplanted into the nursery; in doing which they should be placed in rows, at the distance of a foot or a foot and a half; the proper seasons for performing the work being in the early autumn or spring months. From this situation, after remaining twelve months, some of them may be taken for the purpose of training, and being planted against walls, paling, or other fences adapted to the purpose.

But in order to propagate a variety with the greatest degree of certainty and success, it is best to pursue the method of budding, as by this means the trees become much sooner in a state of bearing, and, at the same time, produce a fruit, which in size, colour, and taste, has an exact resemblance to that of the tree from which the bud was cut. It is sometimes the case, that peaches are budded on stocks of different sorts, as the apricot, the almond, the plum; but the last, as being more hardy and suitable to afford a full bearing condition, should always be preferred: it has also another advantage, that of thriving in almost any kind of soil. When it can be procured, the muske plum stock is by much the best, as being most prosperous and durable.

By sowing the seeds or stones in the manner

made from the few eyes that were left, such should be rubbed off as come out either in front or back of the branches, retaining the lateral ones only, which, as they arrive at sufficient length, as about June, should be nailed to the fence, and remain during the summer without being shortened.

When the leaves have fallen, about November, or in the following March, the first winter-pruning may be performed, which should be done according to the number of shoots produced from the heading down: if there be two shoots, one on each side, they may both be retained, being cut to eight, ten, or more inches, in proportion to their strength, to promote a further supply of wood, nailing them to the fence in a horizontal direction. If there are three shoots, and the middle one regularly placed, it should be put in an upright direction; if four, two should be trained on each side, equal number, strength, and regularity at this period, being chiefly to be attended to.

In the second year's summer pruning, the shoots should but in few instances be shortened; and all such as proceed from the horizontal branches of the former year preserved and trained, except the *fore-right* shoots, which should be rubbed off as useless.

The pruning the second winter should be done about the same period as the first; the weak shoots should be removed, and the branches preserved in as much regularity and uniformity as possible as to number and size, shortening them as above directed.

Mr. Forsyth advises, in the first year, when the leading shoot is very strong, to pinch off the top of it about the beginning of June, which will make it throw out some fine strong shoots, to help to fill the walls. None of the shoots should, he thinks, be suffered to grow too long during the first and second years; which may always be prevented by pinching the ends of them; but they should never be topped when the tree sends out fine kind shoots, till the spring following, when they may be pruned according to the strength of the tree, and the quantity of wood it has made during the preceding summer, leaving the shoots from six to twelve inches long; by which means the lower parts of the walls will soon be able to be filled. It is, he observes, too common a practice to lay in the shoots at full length, taking off only the points of the branches, which generally, after a few years, leaves the walls quite naked: whereas, if attention were paid to the training, especially for the first four years, the walls might always be filled with fine bearing wood from top to bottom, and the trees produce a great deal more fruit, and of a much finer quality than when they are

run up in the former way; for those trees, in general, are so weak that they have not strength to bear good fruit. The third year, if care be taken to manage the trees properly in summer, they may be brought into a bearing state. If the ground be strong, they will grow very vigorously; in which case, pinch all the strong shoots about the month of June, which will make them throw out side-shoots; these, if not laid in too thick, will make fine bearing wood for the succeeding year. If the strong shoots be suffered to grow to their full length, they will be large and spongy, and will neither produce fruit nor good wood for the following year. Weak shoots should, he thinks, never be nailed, although they may be full of blossom, as they never bear good fruit. Sometimes weakly trees are covered over with blossom; but if too much fruit be suffered to remain on them, they will be weakened so much that they will never recover. In that case he would recommend picking off the greater part of the fruit, to let the tree recover its strength. When trees are pruned in the above state, he cautions gardeners never to prune at a single flower-bud; as if that be the case it is sure to kill the shoot; or, it will at least die, or be destroyed as far as the wood-bud which is nearest to it.

In pruning, where attention is bestowed, some shoots, and sometimes whole trees, are, he says, found with nothing but single flower-buds. These sorts of shoots should be laid in at full length, and always attend to the next branch that has got some wood-buds, and cut it close, that it may produce fine wood to supply the place of those that have only flower-buds, which may be cut out the year following.

At the period when peach-trees come into a bearing state, there will, in general, be seen two flower-buds close together, and in looking between these flower-buds, what is termed a wood-bud may be seen; the cutting should constantly be performed at these double buds, as the shoots which bear fruit the following year come out from between them.

The proper form for bearing being thus attained, the trees may be preserved and kept in order by requisite summer and winter pruning.

Mr. Forsyth, however, observes, that when the trees come into a bearing state, they may be kept in a flourishing condition by proper management and attention to the summer pruning. It has often been his practice to top the strong shoots twice in the course of the summer, before he could get them to produce fine kind bearing wood, having often had shoots that grew, in the course of one summer, upwards of six feet in length, and as thick as his thumb. If such shoots as these be laid in near their full length,

the lower part of the wall will, he thinks, be left naked; besides, these strong shoots exhaust the tree of its strength, and never produce good wood, if neglected to be topped in the summer. He recommends the cutting out all such shoots when the trees are pruned in the spring, and to leave only the fine kind bearing wood, which is easily known by its having two small leaves where the flower-buds are to be the following year, while the strong shoots have one leaf-bud only at each eye, constantly taking care to lay the branches as horizontally as possible, which will check the growth of the shoots, and, at the same time, make the wood much finer, and more fit for bearing the succeeding year. All the useless side-shoots that cannot be nailed in against the wall should invariably be rubbed off, leaving only the best, which must be laid in about three inches apart.

Much attention is likewise recommended to the picking off all the side-shoots that come out near the tops of the branches; as, when left, they weaken the fruit-bearing branches for the ensuing year. This is best performed as soon as they can be laid hold of by the finger and thumb, for when suffered to grow strong they hurt the fruit-bearing shoots very much.

In the old trees, where they run up to the top of the walls, leaving three-fourths of them nearly naked, the best way, according to the same writer, is to cut them as far back as any young shoots or buds can be found. Some young shoots or buds must always be left on peach-trees, otherwise the life of them will be endangered. They should never be headed down in the manner of the apricot, apple, or pear-tree. If peach-trees are headed down, without attending to these cautions, a great risk is run of killing them; but where there are a few young shoots the top may with safety be cut off just above them, as they will lead the sap up, and produce strong branches, which should be topped in the same way as young trees that are intended to fill the walls.

Mr. Forsyth further observes, that it is always more difficult to procure new wood from old peach-trees than from any others, except nectarines. He has often made incisions in the old branches, about the joint, cutting out a piece from one to three inches, according to their sizes. This he advises to be done in several places of the tree, to furnish it with young wood; always rounding the edges where the incision is made, which should be above the joint, but as near to it as possible. The operation should be performed in the month of April; but not unless some young shoots are perceived to make their appearance; which, when they are about three or four inches long, cut off the old branch, by

which means the fresh young wood will make a rapid progress the first summer, and in the following year fine fruit will be produced on them.

The use of his *composition* is constantly advised where old branches are cut off, and care should be taken to round the edges.

It becomes necessary, according to the same horticulturist, about the latter end of April, to look over the trees again, and rub off what superfluous *fore-right* shoots have remained from going over them the first time. If the trees were examined once every fortnight it would, he thinks, be the better, as by such means they would be kept in more perfect order. He has so accustomed himself to look over trees, that he does it as he walks about his ordinary business, which saves much time.

The principal object, or that of bearing fruit, is, according to some, best effected by shortening each year's branches in the winter prunings, as by this means they are made to afford both a supply of bearing wood and a crop of fruit, the year old shoots most generally affording the greatest supply.

The general summer prunings are, by some, chiefly directed to the reforming of irregularities in the numerous shoots produced; but the winter prunings, to the reforming of the branches of all ages, sizes and situations, and to the rendering the trees healthy, beautiful, and productive.

Nailing.—As the pruning advances the nailing should be performed, in which operation great regularity should be observed in laying the branches in a horizontal direction, having the extremities very little raised above the part from whence it takes its direction, the degrees of obliquity being as little as the nature of the situation will allow. The shoots should likewise be placed at such suitable distances from each other, as that, when the leaves are fully expanded, they may have sufficient room to stand without shading the branches in too great a degree. These last should never be nailed in an upright, where it is possible to give them any other direction, as, in such cases, they are liable to send off shoots from the highest eyes, and leave the inferior parts of the shoots quite naked. If too much wood has been left, it must either be cut out altogether, or to an eye, for the purpose of a shoot the succeeding year.

Mr. Forsyth advises that care should be taken not to let the shoots get too long before they are tacked to the wall, lest they should be broken by the wind. He does not, however, approve of nailing the young wood too soon; for, by so doing, the heat of the sun is apt to occasion them to grow too fast.

By saving some of the largest and straightest

M

shoots that are cut off, and running them in among the small branches of the trees to prevent them from being broken by the wind, the middle of the branch run in, being on the outside of the shoot that is wished to be preserved, and the ends tucked under the two adjoining branches, a great deal of the second summer nailing may be saved. Immediately after the fall of the leaf it will be necessary to take out these loose branches; by which the shoots may have more liberty, and the sun and air be more fully admitted to ripen the wood before the spring pruning commences.

At the time this nailing is performed, carefully take off all the side shoots that come out from the tops of the young shoots. In performing the second nailing, if any very strong shoots are found, they should be cut out, leaving the fine kind side shoots that have been produced since the first topping, but only such as will bear fruit.

When the autumn proves fine, the trees mostly continue in full leaf to the end of October, and sometimes to the end of November. At the time the leaves begin to fall, a soft broom should be employed, brushing it gently over the branches of the trees, in order to take off as many of the leaves as possible, without hurting the buds. The brushing should however be performed upwards, for in the contrary direction it will be liable to break and destroy the buds.

When all the leaves are removed, Mr. Forsyth advises the unnauling of the young branches that were nailed in during the summer, leaving the strong ones to keep the tree fast to the wall, as, by these means, from the branches being loose from the wall, they will receive the benefit of the sun and air more fully, to ripen and harden the young wood, which, in that case, will not be so liable to be killed by the severity of the winter season; and, by leaving the trees so till the spring, when the pruning is to be performed, there will be a great choice of fine bearing wood to cover the walls with.

He also advises the nails and shreds laid up in autumn, when the branches were unnailed, to be pointed and picked during the wet weather in winter, in order to be fit for use again; and that such shreds as have been used in summer be soaked in boiling-hot soapsuds for three or four days, in order to destroy the eggs of earwigs and other insects, which are highly destructive to this sort of trees.

These trees, from their coming early into blossom, should be protected from the frosts to secure the fruit: various means have been attempted for this purpose; the most effectual are, by nailing light mats or strong open canvass over them, which should be removed in the middle of the day, but kept close in the night and when the

weather is severe. Mr. Forsyth finds old netting the best covering, which should be put on threefold, as for apricots. When the leaves begin to cover the fruit, and the weather appears to be fine and settled, the netting may be taken off by degrees, but by no means all at once. By means of forked sticks, the nets may be kept at any distance required; but he advises, never to be in too great haste to uncover the trees, or suffer the shoots to grow through the meshes of the nets; as when that is the case, many of them will be broken in taking them off. He thinks it best to uncover the trees in cloudy weather, or when it is likely to rain; as when the nets are taken off in clear weather the leaves are liable to be injured by the sun. In taking off the *fore-right* and side shoots care is necessary not to expose the fruit; the best method is to rub them off near the extremities, leaving those which are wanted to fill up the wall as low on the branch as possible, and only one as a leading shoot.

When the fruit of these trees sets too thick, thinning becomes necessary, according to the vigour and size of the tree. The largest and best placed should be left; if the leaves cover too much they should also be pinched off.

Mr. Forsyth advises this to be done when the fruit is about the size of a small marble, which must be left much to the judgment of the person who performs it; but it should be according to the strength of the tree, and be done very regularly, that the fruit may be equally dispersed over the tree. When left too thick, it will not have room to swell, as frequently happens; but, if the tree be very strong, from three to six peaches may be left on each shoot, according to the strength and length of the branch or shoot.

It is remarked, by the ingenious author just noticed, that "he has observed, that where the *composition* he recommends was applied to prevent the sap from being exhaled by the sun and air, all the trees that were very much loaded with fruit were not in the least hurt, while the trees that were treated in the common way were greatly injured, and often killed when they had a great crop."

It is of great advantage, in the opinion of this writer, in very dry seasons, to make a large bason round each tree; or, what is better, make up an edge along the whole border with mould, as for a bed to bed out plants in a nursery, and then give the trees a good watering, and mulch the border with some perfectly rotten dung or leaves, which will keep the roots of the trees moist, and prevent the ground from cracking. The trees should be watered once a week during dry weather, and the branches and leaves sprinkled every other day in the afternoon, with an engine, pressing the

forefinger over the mouth of the pipe, to spread the water very fine. In this way the trees may be kept clean and free from insects. The sprinkling should not, however, be performed when the sun is on them, nor too late in the evening, as in the former case the leaves are liable to be scorched, and in the latter the mildew is apt to be brought on the tender sorts of peach-trees. When any of the trees are infected, leave off sprinkling them, or let clear lime-water be applied, but this should only be done in warm weather. Frequent sprinkling the trees with lime-water, and throwing it plentifully on the underside of the leaves, has been found in a short time to extirpate the acarus, or red spider, which is so destructive to peach-trees.

It is likewise advised to keep the fruit well shaded, and never to suffer the leaves to be picked off till the fruit be grown to its full size, when some of them may be taken off, to let the fruit attain its natural colour, as once a week, in a gradual manner; by which means, the fruit will continue much longer in succession than if they were picked off all at once.

It is considered as a bad practice to pick off the leaves of these trees before the fruit is grown to its natural size, as the shade of the leaves assists the fruit very much; and, wherever the leaves are picked off, the fruit is small, stunted, and ill-flavoured. It is found of utility against earwigs and other insects, to hang up short pieces of bean-stalks tied together before the trees, previous to the fruit's beginning to ripen; as by that means they may be collected and destroyed.

Any canker that may be in the old bark where the branch was amputated, is likewise recommended to be carefully removed.

The vegetable disease termed the canker is very liable to attack peach-trees, in which it is of a brown colour; and, in the bark, it appears in small specks or dots, as if made with a pen. All these are recommended to be cut out clean; for if any part of the canker remain it will affect the new wood as it begins to grow. Wherever gum is seen oozing, it may be concluded that the canker is not completely eradicated from the tree.—*See Canker.*

The blight is a disease with which peach-trees are liable to be affected, and by which the leaves are shriveled or curled up and much thickened. It arises from the imperfect nourishment and growth of the trees, from insects, and other causes, and is to be remedied by altering the state of the trees, removing the diseased leaves, washing with water in the heat of the day, or fumigating with tobacco smoke, &c.—*See Blight.*

Though trees of this kind begin to bear fruit the second or third year, they may be considered

in a state of training to their sixth or seventh, and will continue from thirty or forty to fifty or sixty years, especially when raised on plum-stocks in good bearing, where proper care and attention is bestowed in their management. And it is asserted by some, that the fruit of such old trees is much finer flavoured than such as is produced on young trees. Garden plants of the smaller kinds, that are taken off early in the spring, may be occasionally grown on the borders about them; and in the culture of the peach tree a little dung should occasionally be inserted in digging over the borders.

Forcing of Peaches.—Besides the method of raising these trees against walls in the open air, they are frequently cultivated in forcing-frames, hot-walls, and houses constructed for the purpose, in order to have the fruit more early. The first of these modes is not, however, to be much recommended. Mr. Nicol, in his *Forcing Gardener*, strongly objects to oiled paper frames, and frames placed against flued walls without front flues; to the first, on account of its darkness, and incapability of admitting the rays of light and free air, both of which are so indispensably necessary to the health and vigour of the trees; and to the second, because the front is the most valuable flue in any house, equally on account of the saving of fuel, from the circumstance of its having a greater command of temperature, and the injury done the trees by the violent heat of the back flues in keeping up the proper temperature in stormy weather; besides the propensity of insects to harbour and breed between the trellis and flue in such cases.

Suitable houses, contrived for the purpose, are constantly to be preferred: such as are wrought by one fire, communicating first with the front flue, and then having two returns in the back wall, are, in the opinion of the same writer, best adapted to early forcing, as the strength of the heat is expended in the front, so that by the time it returns to the back flues it becomes of a slow, mild nature; from which no danger can be entertained, even at the most early season of forcing. Plans for houses of this sort may be seen in the annexed plate. They may be so contrived as to serve the purpose of grapes as well as for peaches; and have one or two fires, according to circumstances.

In the latter kind a trellis may be fixed against the roof, beams or rafters, to the extent of half their height; trees being planted between the front flue and wall, and trained thereto, as these will not shade those on the back, and of course one house be rendered nearly as good as two, as the trees on the front will have an extent of eleven or twelve feet to extend themselves in.

The most advantageous situation and aspect for houses of this sort, are such as are rather elevated and face the meridian sun. For the borders Mr. Nicol advises three-fourths strong brown loam, an eighth light sandy loam, and an eighth stable dung, with about a fortieth part of shell marle, as the composition. The borders should be full three feet deep; and the breadths, for the narrow houses, about fourteen feet from the back wall; and for the wide ones all the width of the house within, and to the extent of twelve feet on the outside. They should be kept well trenched and perfectly fine on the surface, and have, occasionally, well rotted dung dug into them.

For this purpose, as well as that of planting against open walls, maiden or one-year trained trees are to be preferred: some likewise plant what are termed *riders*, of the same age, between the dwarf-trees; but the practice is not, by any means, to be recommended, as the nourishment of the others may be thereby greatly impaired. The proper distance is from twelve to fifteen feet, according as the house will best divide, for the dwarf-trees; and the best season of planting is any time from about the first of November to the beginning of the following month; in the performing of which the holes should be covered in with a light earthy compost, shaking it well in between the roots, and settling it well with a little water about them.

The sorts that are the best suited to this use have been already described.

The methods of training in these are much the same as in the preceding cases: by that of the fan-kind, they probably succeed the best. Immediately after planting, in order to make the trees put forth vigorously and fill the trellis completely from the bottom in the dwarf-trees, head them down to two or three eyes on each shoot if maiden, and to the last eye on each branch if one-year trained trees. Others however think it better to defer the operation till the early spring, when the trees are planted in the autumn. In respect to the intermediate trees, they are only set for the purpose of obtaining a crop or two while the principal ones are filling the spaces: it is not necessary to shorten them so much, whether they be maiden or trained trees, as by this means they put forth more moderate shoots, and come sooner into a bearing state, which is the chief object: they should be moved as the other trees fill up the trellis.

As soon as the shoots have attained the length of two or three inches, such as are placed *fore-right* or *back-right* should be rubbed off, and the others laid in, as they advance in growth, at the distance of nine or ten inches, care being taken not to include the leaves with the tie, and to

allow sufficient room for the swelling of the shoot, pinching off all the laterals as they appear. And when their growth is stopped for the season, cut them back from half to a third of their lengths, in proportion to their strength; and, in dressing, keep the side ones well down, in order to fill the bottom part of the trellis well. The same plan must be followed in the second season, laying the undermost shoot on each branch to furnish the under part of the tree, and the uppermost as a leader; carefully rubbing off all the intermediate ones, when not wanted, and at any rate the *fore-right* ones, leaving them generally at three-fourths of their whole length. Where the wood has been well ripened this season, they may bear a few fruit in the following. However, unless the trees are very vigorous only a very few should be suffered to remain; as it is better to furnish the trellis well for a future crop, by laying in the summer shoots regularly at the distance of six inches; and in the winter-pruning shorten the shoots of the extremities of the tree only a few inches each, laying in those of the middle at full length. This practice may be continued till the trees have wholly filled their places; afterwards shortening none, except to fill casual vacancies, or where the extremities of the shoots have been injured by bruises or other causes.

Afterwards these trees require to be frequently looked over in summer, and divested of lateral and other improper shoots, being kept regularly thin, and dressed to the trellis, &c. in a neat manner; and in tying care must be taken not to tie too near the point of the shoot; a few joints being constantly between the last tie and extremity of the branch.

When the fruit is fully set, select such buds as are thought necessary to be left, and rub off the rest in a careful manner; the uppermost and undermost ones, and sometimes one or two about the middle of the shoot, are mostly left the last in an alternate manner.

At the time the fruit begins its last swelling, it should be exposed to the sun and air as much as possible, properly thinning the leaves.

In this method it is not necessary to apply artificial heat before the third season; and then only to ripen the wood, in the autumn, when that becomes necessary for the better bearing in the succeeding year. But even in this the trees will only bear very gentle forcing.

In the fifth season the forcing may begin about February, when, according to the author of the Scotch Forcing Gardener, the fire should be made so moderate the first fortnight, as that the thermometer may not stand, at eight at night and seven in the morning, higher than 45°; raising

it in the course of the second fortnight to 50°, and afterwards gradually to 55°; at which point it should be kept till the stoning is over, and then increased to 60°; and in the time of the fruit's ripening to 65°, which it should never pass, as it would draw the young shoots up in a weak growth. In conducting the business, the greatest regularity and steadiness should be preserved; as the trees are impatient of sudden checks of all kinds, especially in the time of setting and storing the fruit.

A free circulation of air is constantly necessary, Mr. Nicol thinks, from the time the trees are planted, in the day-time, from sun-rise to sun-set the first season, and afterwards occasionally in the second, the house being shut up at night from the beginning of March, and the same in the rest. At the time the forcing begins, it should be shut up at night from the middle of January, and have a full and free circulation through the day till the beginning of February; after which it may be admitted in a more moderate degree, according to the weather, respect being paid to its temperature till the bloom begins to open. After this, less or more must be admitted every day, if possible; as the setting of the fruit in a kindly manner depends much on fresh air being applied, and a free circulation of air kept up. In sunshine it may be admitted at this time to the extent that the thermometer may not stand at more than five or six degrees above the fire-heat medium; and at no time, till the stoning is over, above ten degrees; but afterwards, in the middle of the day, it may be suffered to rise to the height of fifteen. When the fruit begins to colour, the house should be opened by sun-rise, and not shut till sun-set, unless to defend the fruit from heavy rains; no respect being paid to sun-shine, air being equally essential to the flavour of the fruit as the rays of the sun.

This sort of fruit, when in a growing state, requires plentiful waterings; and the border should always be kept in a moist state; only restraining a little in the time of setting and stoning, and totally when the fruit begins to colour.

It may be necessary to wash the house thrice a week from the commencement of the forcing till the flowers begin to open, then withholding till the petals begin to decay, when wash again till the fruit begins to ripen; and then finally withhold, unless the trees are afflicted with the red spider, &c. in which case, wash every day till they are quite cleaned from the insects. And, in the intervals of the washings, steaming night and morning may be practised, as at the blossoming season Mr. Nicol thinks it "of infinite benefit to the trees, as it encourages the setting of the fruit, and prevents the breeding of insects; and

the engine cannot be employed, for fear of hurting the bloom."

It is necessary to thin the fruit in many kinds of peaches, to prevent the trees bearing themselves to death. The operation should, however, be performed with caution, and never be done perfectly till after the stoning is past; as till then all danger of the fruit dropping is not over. Mr. Nicol's rule for final thinning is, "a fruit for every foot square of the surface of the tree for the large kinds, and for every nine or ten inches of the small kinds of peaches, for trees in a healthy and vigorous state."

Mr. Nicol observes that it is customary to let the fruit drop of its own accord when ripe; and for this purpose the border is covered with moss, and nets or mats are hung against the trellis to catch them; but he is of opinion that all kinds of fruit, except grapes, lose much of their flavour if suffered to remain on the plant till dead ripe; and has, of course, always made it a practice to pull his peaches, as in this way not one half as many are lost or bruised as when suffered to fall; and the fruit, from not being dead ripe, is much fitter for carriage. He also recommends this practice, as the border being covered with moss emits a bad flavour; and nothing is so conducive to a good one as the surface being kept clean, and frequently stirred while the fruit is in a ripening state.

The Scotch Forcing Gardener supposes, that by having "two peach-houses, and a few trees planted against the open wall in a south aspect, the season may be prolonged from the first or middle of June to the first of November in constant succession, by beginning to force the first house on the first of February, and the second about the middle or latter end of March;" and that, "where there are three or four houses, and a flued wall, the season may be successively prolonged from the first of May to the first or middle of November." His mode is, to begin to force his first house on the first of December, and, as it is not much to be depended on at that early season, his second on the first of January; his third on the first of March; and the fourth left without the aid of any fire heat. He never applies fire to "flued walls until the first or middle of August, and that in order to ripen the wood, and hasten the maturity of the late fruit." And, by never reversing the successive order of the peach-houses, he thinks, they will always be "ready to vegetate at the same time of the year on the application of fire heat, with much less injury to themselves than if they were changed."

If peach-trees be forced every year, they will, he supposes, "wear out in the course of twelve or fourteen; therefore about the eighth or tenth

year young dwarfs should be planted where the riders stood, and the old dwarfs be converted into riders by degrees as the young ones advance."

For the constant certain production of this fruit, flued walls are indispensably necessary; and where a fine garden is forming, the extra expense in fluing two or three hundred feet of the best exposed wall is but trifling, as, if built on a good plan, and wrought in a judicious manner, the annual expense will not be any great affair.

The methods of protecting the blossom until the fruit be set has been explained already; we may therefore proceed to the business of applying the heat.

But before this is done a trellis, or spars of an inch square, should be fixed against the walls to the height of the first course of the flue, in order to keep the young shoots from being scorched or injured by the fire; as when it has reached the second flue, the trees may lie against the wall without danger of being hurt.

It is the custom of some, to apply fire heat to flued walls in the spring season; but this Mr. Nicol disapproves of, as no species of forcing is so intricate; the trees being placed between the extremes of heat and cold, it is quite impossible to make or regulate a climate for them. In his opinion, "all that is necessary for the production of a crop, is, ripening and hardening the wood in autumn, and screening from frosty and boisterous winds in spring."

When the buds begin to appear turgid in the spring, he advises screens to be hung up: and, "if canvass, let down in the day, from eight in the morning to five or six in the afternoon, in mild weather; but if boisterous frosty winds prevail, to continue them all day; and they should not be totally removed till about the middle of June; by which time the fruit will be fairly set, and all danger past. About the first or middle of August, according to the season and forwardness of the fruit and wood, the fires may be lighted. These must be made very moderate at first, and increased as the season advances. If the surface of the wall about the second course of the flue be kept milk warm in the night, it is, he thinks, all that is necessary;" and the quantity of fuel must not be enlarged in a stormy night in this case in the same degree as in a hot-house; as by that means all would be ruined; for the intention in the application of fire, in this instance, is not the forming a climate for the trees, but the ripening the young shoots for the production of fruit in the following season.

The nectarine admits of being forced in the same manner.

In the dwarf and double-blossomed kinds of Peach-trees the propagation is accomplished by

budding them on stocks of the same sort as those of the peach-tree.

These are principally cultivated for the purpose of ornament, as when planted in the borders of shrubberies, or other places, they are curious, and produce a fine effect early in the season. The dwarf sort is sometimes planted in pots, and when exposed with the fruit upon it has a striking appearance.

The common peach-tree may likewise be placed as a standard in sheltered situations in pleasure grounds, as it has a fine appearance when in full blow.

Culture in the Nectarine Kind.—In the propagation, culture, and management of this tree, the same attention will be necessary as in the peach. In this case it is, however, better to take the buds from old bearing trees, and not from young ones as is commonly the case. And in the pruning, particular care should be taken not to lay in the wood too thick or close.

Mr. Forsyth observes, that "on account of the smoothness of the skin, the nectarine suffers much more from millepedes or wood-lice, ear-wigs, &c. than the peach: it will therefore be necessary to hang up a greater number of bundles of bean-stalks about these than about other fruit-trees. Wasps are also very destructive to Nectarines, and the trees are very liable to be infested with the red spider." He advises, the walls with the stems and branches of the trees to be carefully inspected, and all the snails about them picked off and destroyed, as young snails frequently commit great depredations on the leaves before the fruit is fully ripe.

After the fall of the leaf the young shoots should, he says, be unnailed, in order to harden the wood; and in hot weather, basins formed on the borders, and mulched as for peaches. And watering with the engine is also to be practised in dry hot weather in the same manner.

The fruit should be thinned when grown to a tolerable size, but the leaves never picked off till the fruit be fully grown.

AMYRIS, a genus comprehending different balsamiferous shrubs, of the *sweet-wood* kind, and which are tender exotics for the stove.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Terebinthaceæ*.

The characters of which are, that the calyx is a one-leaved, four-toothed, acute, erect, small and permanent perianthium; the corolla consists of four oblong, concave and spreading petals; the stamina have awl-shaped, erect filaments; the anthers, oblong, erect, of the length of the corolla; the pistillum has a germ, superior, ovate; the style thickish, of the length of the stamens; and the stigma is four-cornered; the

pericarpium, a drupaceous, roundish berry; and the seed, a round, shining nut.

The species are: 1. *A. elemifera*, Gum-elemi Tree; 2. *A. maritima*, Small Shrubby Sweet-Wood; 3. *A. Gileadensis*, Balsam of Gilead Tree; 4. *A. Opobalsamum*, Balsam of Mecca Tree; 5. *A. toxifera*, Poison Ash.

The first species rises in a shrubby branching manner to the height of about six feet. The leaflets are pointed, stiff and shining; the leaves being opposite on peduncles two inches long; and at the ends of the branches four or five slender stalks issue, set with many very small white flowers, in a little corymb. The petals are inflex at the tip. The fruit is the size and figure of an olive, and the colour of a pomegranate, having an odoriferous pulp within it. It is a native of Carolina and Brazil, and affords the resin known under the name of Gum-elemi.

The second species is a shrub of the Dwarf kind, branching, with a juice like that of the former, but pleasanter, and smelling like Rue. The leaflets shining, ovate, and finely notched, but scarcely an inch long; the racemes, as in the former; the fruit twice as big, of a black colour, with a purple juice. It is found on rocks by the sea-side about the Havannah.

The third, or Balsam of Gilead Tree, is a shrub with purplish branches, a little striated, having protuberant buds loaded with balsamic resin. The leaves are crowded, petioled, ternate, smooth, and the leaflets sessile, quite entire, lanceolate, somewhat acute, that at the end larger than the others, wedge-lanceolate. The flowers proceed from the same buds, by threes. Proper peduncles one-flowered, shorter than the leaf, sheathed at bottom. The bracte extremely minute, slightly bifid. It is doubted by some whether this be distinct from the following species. The Balsam of Gilead is extracted from its buds.

The fourth species is mostly represented as rising to the height of a moderate shrub. According to Bruce, one of these was five feet two inches high from the part where the red root begins, or which is buried in the earth, to that where it divides itself first into branches. The trunk at the thickest part was about five inches diameter; the wood light and open, and incapable of being polished, covered with a smooth bark of blueish white casts, like that of a standard cherry-tree in good health. Indeed a part of the bark is a reddish brown: it flattens at top like trees that are exposed to snow blasts or sea air, which gives it a stunted appearance. It is remarkable for a penury of leaves. The flowers are like those of the Acacia Tree, white

and round, only that three hang upon three filaments or stalks, where the Acacia has but one. Two of these flowers fall off and leave a single fruit; the branches that bear this are the shoots of the present year; they are of a reddish colour, and tougher than the old wood. It affords the Opobalsam, or Balsam of Mecca.

In the fifth species the leaves are pinnate; the petioles long and five-leaved. The leaflets ovate-oblong, evergreen, quite entire, opposite with a terminating one, all pedicelled. The racemes several, axillary, filiform, with scattered flowers. Catesby describes it as a small tree, with a light-coloured smooth bark, and the fruit as hanging in bunches, shaped like a pear, of a purple colour, covering an oblong hard stone. From the trunk a liquor distils as black as ink, which the inhabitants say is a poison. Birds feed on the fruit. It is a native of America.

Culture.—The propagation in these shrubby trees is the best accomplished by sowing the seeds, which must be procured from the places of their natural growth, in the early spring months, in pots of good rich mould, and then plunging them into a good bark hot-bed, very slight waterings being occasionally given. They may likewise be raised from cuttings from the young branches, which should be planted in the early spring, in pots filled with good earth, well closed about them, and immediately placed in the hot-bed, a very little water being given at the time of planting, and afterwards according as there may be a necessity for it.

From the very tender nature of these plants they require to be kept constantly in the stove, and to have the same attention bestowed upon them as others of the exotic tender kinds. They are chiefly cultivated for the purpose of affording curiosity and variety in collections of exotics.

ANACARDIUM, a genus comprising a plant of the tender exotic tree kind; the Acajou, or Cashew nut.

It belongs to the class and order *Polygamia Monœcia*, and ranks in the natural order of *Holoraceæ*.

Its characters are: that it has hermaphrodite and male flowers, either mixed with the hermaphrodites, or on a distinct tree. The calyx of the former is a five-leaved perianthium; the leaflets ovate, concave, coloured, erect, and deciduous; the corolla has five petals, lanceolate, acute, three times as long as the calyx, upright at bottom, and reflex at the end; the stamens have ten filaments, united at the base and upright, nine of them capillary, shorter than the calyx, one thicker, double the length of the others, lying on the germ in front; the antherae roundish; in the longer filament large and fer-

tile, in the rest small; the pistillum has a kidney-shaped germ, obliquely emarginate in front; the style subulate, bent in, the length of the corolla; the stigma small, roundish, depressed, and concave; no pericarpium; receptacle fleshy, very large and obovate; the seed a nut, kidney-shaped, large at the top of the receptacle, with a thick shell, cellular within, and abounding in oil. The calyx, corolla, and stamina, of the male flowers, as in the hermaphrodites; the pistillum has either no germ, or one that is abortive.

There is only one species, the *A. occidentale*, Cashew Nut Tree, Cassu, or Acajou.

In its native state this is said to rise to the height of a tree; but according to Brown from twelve to sixteen feet, spreading much as it advances from the distance of five feet from the ground. It here, however, only rises to the height of a small shrub. The leaves are coriaceous, subovate, shining, and quite entire, petioled and scattered alternately. The panicles are corymbed, diffused and terminating, containing numerous sweet-smelling flowers, resting on an oblong receptacle, hardly to be distinguished from the peduncle. The corolla is red, and has commonly ten stamina, one of which has no anther, but there is often not more than seven or eight, all of which are fertile. Occasionally there are female flowers entirely destitute of stamina.

The fruit is varied in colour, some of the apples being yellow and others red, according to circumstances. The flavour is agreeably subacid with a degree of astringency. The nut springs from one end of the apple, and is somewhat of the size and shape of the kidney in the hare, being the largest at the end which is attached to the fruit. The outer shell is of an ash colour, and very smooth; beneath which is another covering that envelopes the kernel, and between these a thick inflammable oily substance is deposited, which is very caustic in its properties, often affecting the mouth when incautiously put into it to be cracked.

Culture.—The propagation in this plant is effected by setting the nuts, which are procured from America, in small separate pots of light sandy earth, and then ploughing them into a good bark bed, without any water being admitted till the plants are come up, as the nuts are apt to rot by moisture. If the nuts be fresh the plants soon advance to the height of four or five inches, but do not make a great progress afterwards. As they do not bear transplanting, the best method is to break the pots at the time of their removal, being cautious to preserve the mould about them, so as to place them in pots a size larger without its being much disturbed.

These should be immediately filled up with earth of the same sort as above, and replaced in the bark hot-bed. The plants should not be removed oftener than once a year, when care should be taken that the pots are not too large, as they require the roots to be confined in order to their thriving well.

It is necessary to keep the plants constantly in the stove, as they are too tender to stand the exposure of the atmosphere in the warmest season of the year in this climate, even in the green-house. As they are of a succulent nature little water is required even during the summer season; and in the winter a very little, once a fortnight will be sufficient. In this way they may be kept several years, but they grow but slowly after the first, seldom rising to more than two feet or two feet and a half in height.

The juice expressed from the fruit of this tree in its native state, when fermented, affords an agreeable wine; and by distillation a spirit is drawn from it which is preferable to arrack and rum in the making of punch. The fruit is sometimes sliced and used in punch for the purpose of giving it a fine flavour.

The kernel of the nut in its fresh state has a delicious taste, and abounds with a saccharine milky juice.

The oil which it affords is an admirable preserver of timber; and the milky juice obtained from the body of the tree produces an indelible black colour on linen. It likewise produces an astringent gummy substance.

ANAGALLIS, a genus comprising a plant of the herbaceous perennial kind, which is known by the name of Pimpernel.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rotaceae*.

Its characters are: that the calyx is a five-parted, sharp, and permanent perianthium: the divisions keeled: the corolla is wheel-shaped: the border five-parted: divisions ovate-orbiculate, with the claws connected: the stamina have erect filaments, shorter than the corolla, shaggy below; anthers simple: the pistillum is a globose germ, style filiform, slightly bending, and the stigma capitate: the pericarpium is a globose, one-celled capsule, opening transversely: the seeds are very many and angular: the receptacle globose, very large.

The species chiefly cultivated in the garden is the *A. Monelli*, Upright Perennial Anagallis, or Pimpernel.

It is an erect plant about a foot in height, rather bushy, closely adorned with leaves in pairs or threes. It affords in April and May a great number of wheel-shaped blue flowers,

resting on long foot-stalks, which have a good effect. It is a native of Italy.

Culture.—This plant is not difficult in its propagation, which may be either by sowing the seeds or by cuttings. In the first method the business should be performed in April on a warm border, the seed being very lightly raked in; but in the latter it must be done in the summer season, a shady situation being chosen for the purpose. In either method the plants must be potted and placed in the house during the winter season. They require moving occasionally into larger pots, which should always be done with a ball of earth about their roots. Moderate waterings are likewise necessary.

This is a plant which is employed for the purpose of ornament in the green-house.

ANAGYRIS, a genus comprehending plants of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Papilionaceæ*, or *Leguminosæ*.

Its characters are: that the calyx is a bell-shaped perianthium, mouth five-toothed, the upper pair of teeth being more deeply divided: the corolla papilionaceous, standard obcordate, straight, emarginate, broader than the other petals, and twice as long as the calyx: wings ovate-oblong, flat, longer than the standard, keel straight and very long: the stamina have filaments parallel, distinct, rising: anthers simple: the pistillum is an oblong germ, the style simple and rising: the stigma villose: the pericarpium an oblong, large, roundish, obtuse legume, a little reflex: the seeds six or more, kidney-shaped.

The species cultivated are: 1. *A. foetida*, Stinking Anagiris, or Bean Trefoil; 2. *A. Cretica*, Cretan Stinking Anagiris, or Bean Trefoil.

The first is a shrub that usually grows to the height of eight or ten feet. The leaves are oval, and the flowers, which are produced in April or May, are of a bright yellow colour, butterfly-shaped, hanging in long spikes from the sides of the branches, somewhat as in the *Laburnum*. It never ripens its seeds in this climate. It is a native of the south of France, Spain, and Italy.

The second sort has the leaves longer, and also the spikes of flowers. It also flowers later in the summer, and never matures its seed. It is supposed by some to be only a variety. It is a native of Candia.

Culture.—These plants are capable of being propagated, either by means of layers or seed. The first method is adopted in order to obviate

the defects of their not producing seed. In performing the operation, the tender branches should be chosen, and it is best done in the spring season, when they should be tongued in the same way as in Carnations. In dry seasons water should be given: a rather shady place is best for the purpose. In the following spring, when the layers have fully taken root, they may be separated from the old plants just before they begin to bud, and be then planted in warm aspects, as when much exposed they are apt to be destroyed in severe winters.

In raising them from the seeds, which is probably the best method, as the plants become taller and handsomer, the method is to sow them in pots placed in a moderate hot-bed about the beginning of March. It may also be done on a warm border of fine rich earth, covering them well with sifted mould, and then protecting them by a glass frame. The seeds are procured from abroad. When the seed is good the plants appear in the course of a month, when they should be gradually habituated to the open air, into which they may be brought about the end of May, being put in sheltered warm situations: this can only be done with those in pots, as they do not bear transplanting well till the following spring. They should be protected under a glass frame in the nights the two first winters, as they do not bear cold well. After they have been kept exposed in pots for about three years, they will be in a condition to plant out where they are to remain. The best season for this is in April, just before they protrude their leaves. They should be turned out of the pots, or be taken up with good balls to their roots, and immediately planted in warm situations, being protected in the winters by tanners' bark about their roots, and coverings of mats on their tops. The fourth year from sowing they usually begin to produce flowers, and continue flowering annually afterwards.

They are highly ornamental, and extremely proper for being mixed with other flowering shrubs of similar growth in warm situations, in shrubberies and other places.

ANANAS. See *BROMELIA*.

ANASTATICA, a genus including some curious plants of the low bushy annual kind, known by the title of Rose of Jericho.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliquosæ*.

The characters of which are: that the calyx is a four-leaved and deciduous perianthium, leaflets ovate, oblong, concave, erect and deciduous: the corolla is tetrapetalous and cruciform; the petals roundish, flat, and spreading,

with claws nearly as long as the calyx, but more spreading: the stamina have six filaments, subulate, of the length of the calyx, from erect spreading; anthers roundish: the pistillum has a bifid, very small germ; subulate style, of the length of the stamens, and permanent: the stigma capitate: the pericarpium is a very short silicle; partition ending in a subulate point, oblique and longer than the silicle itself, the valves parallel, making a cell of the lower half, but standing out from the upper, rounded, concave, gaping, and oblique, and hence having the form of a sheep's hoof: the seeds are solitary and roundish.

The species are: 1. *A. hierochuntica*, Common Anastatica, or Rose of Jericho; 2. *A. Syriaca*, Syrian Anastatica.

The first rises five or six inches in height, dividing into many irregular branches. The stalks are ligneous, though the plant is annual; the leaves fleshy and glaucous. The flowers, which are small and white, are disposed in short spikes at the wings of the stalks, and have little beauty; they are succeeded by short prickly pods, having two cells, in each of which are two seeds. It is cultivated in some gardens for the oddness of the plant, which, if taken up before it is withered, and kept entire in a dry room, may be long preserved; and afterwards if the root be placed in a glass of water a few hours, the buds of flowers will swell, open, and appear as if the plant was newly taken out of the ground. It is a native of Palestine.

The second species has the stem hard, a foot in height, dichotomous from the bottom, branches spreading: the leaves rough with tubercles bearing hairs, which are simple, bifid or trifid; one or two sessile flowers in the axils, and others running out into long loose spikes: the calyxes villous, scarcely half a line in length, rather erect: the petals white, one or two seeds in each cell: the valves tough, so as not to be torn without difficulty. It has a small, sub-globular, drupaceous silicle, ending in a subulate style; below which it is divided by a deep longitudinal furrow, and transversely striated, spherically gibbous at the sides, and rough with tubercles, or hispid with bristles: the skin scarcely any: the shell bony, two-celled: the seeds solitary, ovate, plano-convex, and pale-coloured. It is a native of Austria. Flowers in May and June.

Culture.—The propagation in these is effected by sowing the seeds on a hot-bed in the latter end of March or beginning of April, potting the plants towards the latter end of May, bringing them forward on a gentle hot-bed, and gradually exposing them to the full air. In this

way they will flower in June, and with proper shelter and protection frequently perfect seed in the autumn. The seed will, however, come up in the open ground where the soil is fine, light, and dry; but the plants seldom rise to any size.

ANCHOVY PEAR. See **GRIAS**.

ANCHUSA, a genus comprising several plants, chiefly of the herbaceous perennial kind, of hardy growth, and of the Bugloss kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters of which are: that the calyx is a five-parted, oblong, round, acute, and permanent perianthium: the corolla is monopetalous and funnel-shaped: tube cylindrical, of the length of the calyx; limb semiquinquefid, from erect, expanding, and obtuse; throat closed with five small scales; convex, prominent, oblong, and converging: the stamina have very short filaments in the throat of the corolla: anthers oblong, incumbent, and covered: the pistillum has four germs: the style filiform, of the length of the stamina; stigma obtuse and emarginate; no pericarpium, but the calyx enlarged and erect, contains the seeds in its bosom: the seeds are four, oblongish, obtuse, and gibbous.

The species that are most deserving of cultivation are: 1. *A. officinalis*, Garden Alkanet, or Bugloss; 2. *A. undulata*, Waved Alkanet; 3. *A. virginica*, Virginian Yellow Alkanet; 4. *A. sempervirens*, Evergreen Alkanet.

The first has the stems from a foot to eighteen inches in height and more, the thickness of a finger, slightly angular, hairy and rough. The leaves slightly decurrent, seven inches long, above an inch broad, hairy and rough. The spikes conjugate, terminating the stem; the flowers sessile, in a double row: the calyx hirsute: the corollas purple, near half an inch in diameter. At first opening they are red, but afterwards become purple. Sometimes they are white. It flowers in June, July, and August; and the seeds ripen in a month. It is a native of Italy, Spain, &c.

There are several varieties of it; as, Common Bugloss with blue flowers, with white flowers, with red flowers.

The second species is in height three feet, with many strong lateral branches, produced from the main stem near the ground. The leaves stiff and rough, six or seven inches long, and about half an inch broad at the top, closely embracing the branches at the base, where they are two inches broad; indented and waved on their edges; the upper surface beset with hairs, and very rough to the touch. The spikes of flowers

axillary, a foot or more in length, and reflex. The corollas fine blue. It is a native of Spain, &c.

The third seldom rises a foot in height where the soil is good; and where it is poor not more than half that height. Its flowers grow in loose spikes upon a smooth stalk. It is perennial, flowers early, and is a native of North America.

The fourth species has the stems at the sides of the crown of the root, hispid. The leaves ovate, marked with lines, petiolate, and remote. The peduncles axillary; with two bractes, opposite, sessile, lanceolate-ovate, many-flowered: the corollas blue, with a short tube, rather salver-shaped than funnel-shaped: the calyx thick set with long, white, bristly hairs: the segments rather longer than the tube of the corolla: the germs imbedded in a hollow, glandular receptacle, one or two generally abortive: the seeds rough, of a bony hardness. It is found native in Spain and Italy.

Culture.—All the sorts may be propagated by the roots, care being taken to plant them on such soils as are pretty dry. They are likewise capable of being raised by sowing the seeds in the autumnal season upon beds of sandy earth, and in the following spring removing the plants that are sufficiently strong, and setting them out in beds two feet apart, water being occasionally given. They also all come up well from the self-sown seed. They may be made use of for the purpose of ornament, where a great variety of easy cultivated plants are wanted, though they possess but little beauty.

ANDRACHNE, a genus comprehending plants of the herbaceous and shrubby exotic kinds.

It belongs to the class and order *Monœcia Gynandria*, and ranks in the natural order *Tricocceæ*.

The characters of which are: that it has male and female flowers: in the former the calyx is a five-leaved, equal, marcescent perianthium: the corolla has five petals, emarginate, slender, and shorter than the calyx: the nectary has five leaflets, semibifid, herbaceous, one within each petal, and less than it: the stamina have five filaments, small, inserted into the rudiment of each style, and simple anthers: in the latter the calyx is a five-leaved, equal, permanent perianthium: the corolla has no petals: the nectary as in the male: the pistillum is a germ superior and globose: the styles three, filiform, and two parted: the stigmas globose: the pericarpium is a capsule, globose-trilobate, three-celled, cells bivalved, of the size of the calyx: the seeds are in pairs, rounded on one side, triangular and obtuse on the other.

The species are: 1. *A. telephoides*, or Bastard Orphine; 2. *A. fruticosa*, or Shrubby Andrachne.

The first is a low plant, whose branches trail on the ground. The leaves are small, of an oval shape, smooth, and of a sea-green colour. It is found native in some parts of Italy, and the Archipelago.

The second species rises twelve or fourteen feet in height: the branches have spear-shaped, pointed, smooth leaves, under which the peduncles are produced: these are pretty long, and hang downwards: the flowers are small, of an herbaceous white colour, some of which are male, and others female; but when the latter are situated at too great distance from the former, there are rarely any seeds within their covers, though they seem very fair to the sight. It is a native of the East Indies.

Culture.—In the first sort, which is annual, the propagation is effected by sowing the seeds on a moderate hot-bed in March; and, after the plants are sufficiently high, transplanting them into small pots, to be further brought forward by another very moderate hot-bed, full supplies of fresh air being admitted in mild weather, and occasional waterings. They produce flowers in June, and the seeds become ripe in September, after which the plants decay.

The second sort is capable of being raised either by seeds or cuttings; but it is a very tender plant. The seeds may be sown in pots, and plunged into a bark hot-bed, watering them occasionally as the mould becomes dry in the pots. When the plants are of sufficient growth, they should be removed into separate pots, and plunged into a bark bed, being shaded till they have stricken fresh root; free air being afterwards admitted, and the plants kept constantly in the stove.

In raising them by cuttings, some of the shoots should be selected, and placed in pots of rich earth, then plunged in a hot-bed. After they have taken root they should be removed into the bark-stove, where they must remain.

ANDROMEDA, a genus comprising plants of the tree and shrub kind, which are mostly of the hardy deciduous bushy sort.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters of which are: that the calyx is a five-parted, acute, very small, coloured, and permanent perianthium: the corolla is monopetalous, campanulate, and quinquefid, clefts reflex: the stamina have subulate filaments, shorter than the corolla, and scarcely fixed to it: the anthers two-horned and nodding: the

pistillum is a roundish germ; the style cylindric, longer than the stamens, and permanent; stigma obtuse: the pericarpium is a capsule, roundish, five-cornered, five-celled, five-valved, opening at the corners, partitions contrary, and the seeds are very numerous, roundish, and shining.—*Obs.* It differs from erica in number. In some species the corolla is ovate, in others perfectly campanulate. The anthers in some are awned, in others awnless.

The species are numerous; but those principally cultivated are: 1. *A. arborea*, Tree Andromeda, or Sorrel Tree; 2. *A. Mariana*, Maryland Andromeda; 3. *A. polifolia*, Marsh Andromeda; 4. *A. Dubucia*, Cantabrian Heath, or Trailing Andromeda; 5. *A. paniculata*, Panicked Andromeda; 6. *A. racemosa*, Branching Andromeda; 7. *A. coriacea*, Thick-leaved Andromeda; 8. *A. acuminata*, Acute-leaved Andromeda; 9. *A. calyculata*, Calyced Andromeda; 10. *A. salicifolia*, Willow-leaved Andromeda; 11. *A. buxifolia*, Box-leaved Andromeda.

The first is a shrub growing ten or twelve feet high in Virginia; but in Carolina it rises to the height of twenty feet. The branches are very slender, bending downwards: the leaves are oblong, oval, pointed, alternate: the flowers grow in long, naked spikes from the sides of the branches: they are of a herbaceous colour, and ranged on one side of the stalk.

In the second species the leaves are oval, entire, and alternate: the corolla rather cylindric-bell-shaped; anthers without awns. The corollas are shaped like those of the *Arbutus*, and are of a herbaceous colour. They appear in June and July, and sometimes are succeeded by fruit, which seldom ripens in this climate. There are two varieties; one with oval leaves, another with oblong leaves. It is a native of North America.

The third is an elegant little shrub, from six or eight inches to a foot in height, erect and branched. The leaves sessile, rigid, elliptical, their edges turned back; the under surface glaucous: the peduncles long, of a bright red colour, arising from the summits of the branches, each supporting one oval, nodding flower. The calyx is red, and the corolla of a pink colour. The anthers awned; style white, with a purple stigma. It is a native of America.

There are several varieties; as, with broad oblong leaves; with spear-shaped leaves; with narrow linear leaves.

The fourth species has the stalks and branches low and trailing. The leaves are spear-shaped, revolute, and alternate. The flowers are borne on a single terminal raceme, on alternate undi-

vided subviscid pedicels, with a linear bracte under each. The calyx four-leaved, awl-shaped, erect, purplish, one-fourth of the length of the corolla, and deciduous. The corolla purple, cylindric-oval, twice as large as that of the third species; the mouth quadrid and a little contracted; the divisions bent back. The stamens eight, with white filaments: anthers the length of the filaments, scarcely shorter than the corolla, brown, sagittate, awnless, truncate at top, with two holes: the style filiform, the length of the corolla; stigma obtuse, subquadrid. The seed vessel is a four-celled four-valved capsule. It grows well in the Irish bogs, and flowers in June and July. It is observed by Martyn, that this species has the habit or air of an Andromeda, but the character of an Erica.

The fifth has the stem about four feet high: the leaves are oblong, crenate and alternate: the flowers grow in loose spikes from the ends of the branches, and are shaped like those of the *Arbutus*, but are a little longer, and appear in July; but do not produce seeds in this country. In this the anthers are awned. It is a native of Virginia.

The sixth species differs from the above in the racemes being less panicked; in having a linear, lanceolate, stiff, green, deciduous, bracte, under each flower, longer than it; in the capsules retaining the style; and in the leaves being more serrate.

In the seventh species the branches are three-cornered; the leaves ovate, entire, and shining. It flowers from July to August, and is a native of North America.

The eighth is a shrub about four feet in height, upright, and the whole of it smooth, with round branches, which are leafy to a considerable extent. The leaves alternate, petioled, two inches long, either quite entire, or very obscurely and unequally crenulate, coriaceous, somewhat rigid, very smooth beneath, almost lucid on the upper surface, reticulate with small veins when looked at through a magnifying glass: the racemes are axillary, solitary: there are also others which come out from the branches themselves without any leaf; they are many-flowered, much shorter than the leaves, and spread out horizontally: the pedicels slender and pendulous: the flowers smell like honey: the perianth is green: the corolla snow-white, almost cylindric, with a flat base, and a small, obtuse, five-toothed, revolute border. It flowers in July and August. It is a native of North America.

The ninth species is a low shrub: the leaves shaped like those of the Box-tree, and of the same consistence; with small punctures on them. The flowers grow in short spikes from the extre-

mities of the branches : they are produced single, between two leaves, and are white : the leaflets are oval on the racemes, and from the axil of each proceeds a solitary pedicelled flower : the calyx is covered at the base with two ovate leaflets : the anthers are oblong, bifid, and awnless. It is a native of Sweden. It affects a mossy soil.

There are varieties with oval leaves, with globe flowers.

In the tenth species the stem is arboreous, with vimineous, subflexuose, round, smooth, leafy branches, flower-bearing at the end. The leaves perennial, alternate, petioled, from erect spreading, with the edges a little rolled back ; the upper surface smooth, with two longitudinal vessels parallel to the nerve, giving it the appearance of being three-nerved ; the lower whitish, with a stout reddish nerve, reticulately veined : the petioles channelled, and smooth : the racemes subpanicled and terminating : the pedicels all directed the same way, alternate, simple, short, angular, without bractes ; when flower-bearing they nod, but when in fruit they are from erect spreading : the calyx five-cleft beyond the middle, wrinkled, fleshy, smooth, sometimes ciliate ; the clefts deltoid, bluntish, slightly keeled. The corolla thrice the length of the calyx, ovate-cylindrical ; clefts small, roundish, blunt, and a little turned back : the filaments bent, villose, dilated at the base : anthers upright, oblong, awnless, two-celled, opening at the top in two pores, gibbous at the base : the germ obscurely five-lobed, and smooth : the style almost the length of the corolla, straight, subquincangular : the stigma blunt, with five papillose glands : the capsule woody, smooth, oblong : the valves concave outwardly, inwardly bearing a partition from the middle : the seeds numerous, small, and oblong. It is a native of the island of Mauritius.

In the eleventh the stem is shrubby ; with round, smooth, leafy branches, flower-bearing at top. The leaves perennial, scattered, spreading, blunt, a little rolled back at the edge, bright green and smooth above ; beneath whitish, reticulately-veined, with a stout midrib : the petioles short, channelled, and wrinkled : the racemes towards the top of the twigs axillary, scarcely terminating, straight, simple, angular, slightly pubescent, without bractes, when in flower nodding a little, when in fruit from erect spreading : the flowers in every respect similar to those of the former, except that the calyxes are more ciliate, and the segments of the corollas erect. The unripe fruit is slightly pubescent, but the structure is the same as in the above.

These two species scarcely differ in their fructification : the structure of their leaves is also the same, and they are only distinguished by the form of their leaves ; this having none of those lines parallel to the midrib which are so conspicuous in the other species. It is a native of the isle of Bourbon.

Culture.—These plants are capable of being raised or propagated in different ways ; as by seeds, by layers, and by their creeping roots. They all delight in a rather moist boggy soil.

In the sorts that are raised by seeds, which are those brought from America, they should be sown on a moist bed of earth in the spring season, and care taken to keep them clean from weeds, and the ground in a sufficient state of moisture till they are come up.

In raising them by layers, the autumn is the best season for performing the business, a rather boggy shaded situation being chosen for the purpose. The most tender shoots are the properest for being laid down.

In increasing them by the roots, which may be done in all the shrubby sorts, after the suckers are come up and pretty well grown, they should be taken off with as many fibres to the roots as possible, and planted out in the situations where they are intended to remain, as they do not succeed well when often removed. The early part of the autumn is the best time for the purpose.

The first sort is tender, requiring to be protected from frost in the winter season ; it should therefore be kept in the green-house with a tolerable degree of heat. It also requires much moisture in the summer season.

The other species may be admitted in shrubberies, clumps, and other places, for the purpose of affording variety and ornament. They succeed best when the soil inclines to the boggy kind, or where the land is not too dry in the summer.

The two last species are very beautiful plants.

ANDRYALA, a genus comprising plants of the hardy annual, and green-house kinds.

It belongs to the class and order *Syngenesia Polygamia equalis*, and ranks in the natural order of *Compositae Semiflosculosae*.

The characters of which are : that the calyx is common, many-parted, short, rounded and villose ; the scales very many, sub-equal, subulate, in a double row ; the corolla is compound, imbricate, and uniform : the corollules are hermaphrodite, numerous and equal ; each ligulate, linear, truncate, and five-toothed ; the stamina consist of five capillary filaments, very short : the anther cylindrical and tubulose : the pistillum consists of an ovate germ : the style

filiform and the length of the stamina; the stigmas are two and reflex; the pericarpium none; the calyx converging and globose; the seeds solitary and ovate; the down capillary, the length of the calyx and sessile; the receptacle villose and flattish, alveolate and hairy.

The species of most importance are: 1. *A. integrifolia*, Hoary Andryala; 2. *A. cheiranthifolia*, Various-leaved Andryala; 3. *A. ragusina*, Downy Andryala; 4. *A. lanata*, Woolly Andryala.

The first rises to near a foot and half in height, with woolly branching stems, having the leaves scatteringly set on, which are oblong and downy. The flowers, which are produced in small clusters at the top of the stalks, are of a yellow colour. It flowers in July, and the seeds ripen in September. It is annual, and a native of the south of France.

The second species rises three feet in height: the stem is erect, herbaceous, simple, branch-panicked, at top round, size of the finger, shaggy, marked with the scars of the leaves. The branches alternate, loose, and they and the whole plant covered with a down, glanduliferous at the tips: the glands tawny, and somewhat viscid: the leaves alternate, close, sessile, or half stem-clasping; the upper ones lanceolate, entire, gradually less: the panicle terminal, branching, leafy, and very loose: the flowers yellow, scarcely nodding: the peduncles stiff, one-flowered, round, longer than the opposite leaf: the bracte linear or subulate, sessile, deciduous, with other leafy bractes permanent. It is perennial, and a native of the island of Madeira.

In the third species the lower leaves are about four inches long, but little more than half an inch broad, and very hoary. The stems weak, nine inches in height, dividing towards the top into two or three smaller branches, and at each joint a small leaf almost entire; one yellow flower terminates every branch in June and July. It has been received from the Cape and Algiers.

In the fourth the root is thick and fibrous: the leaves broader, longer, and more downy: the flower-stems near two feet in height, with a single leaf at each joint, whence arise peduncles, each sustaining one large yellow flower. The whole plant is white. It is biennial, and flowers in June; the seeds ripen in August.

Culture.—All these plants are capable of being raised from seeds. In the first sort they should be sown in the spring, in situations in which the plants are to remain, nothing further being required but the proper thinning of them, and the keeping of them perfectly free from weeds.

In the second and third species the seeds should be sown in pots of good earth in the spring, and plunged into a mild hot-bed, in order to be brought gently forward. The former is likewise capable of being propagated by its creeping roots, which may be taken off either in the early autumn or spring seasons. When protected by means of a green-house, they flower the whole of the summer after perfecting their seeds.

The third species, from its hoary appearance, has a fine effect when intermixed with others that have green leaves. When placed abroad, it requires a dry soil and very warm situation.

ANEMONE, a genus comprehending several plants of the tuberos-rooted flowery ornamental kind; being perennial in their roots, but annual in their stems and flowers.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that it has no calyx; that the corolla has petals in two or three rows, three in a row, somewhat oblong: the stamina have numerous filaments, capillary, half the length of the corolla: the anthers twin and erect: the pistillum has numerous germs in a head, the styles acuminate, and the stigmas obtuse: no pericarpium: the receptacle globular or oblong, hollowed, and dotted: the seeds very many, acuminate, retaining the style.

The species are very numerous; but those that most deserve the cultivator's attention in the Anemone kind are: 1. *A. coronaria*, Narrow-leaved Garden Anemone; 2. *A. hortensis*, Broad-leaved Garden Anemone; 3. *A. nemorosa*, Wood Anemone; 4. *A. apennina*, Mountain-blue Wood Anemone; 5. *A. ranunculoides*, Yellow-wood Anemone.

In the first species the flower-stems rise between the leaves immediately from the roots, two, three, or more from the same root, to the height of eight, ten, or twelve inches, having a leafy appendage or involucre a little above the middle. The radical leaves are deeply divided into numerous segments, which are subdivided by threes into many narrow divisions. At the top each stem is adorned with a flower, which in the double sorts is large and very ornamental. It is a native of the Levant, where it grows single, but has been rendered double by cultivation.

The varieties are very numerous: in the single sorts, the Watchet or Pale Blue; the Common Purple; the Scarlet, and many intermediate varieties. In the double kinds, the Common Double Red and Scarlet; the Parti-coloured Crimson; the Crimson Velvet; the Great



Painted by Syd Edwards

London Published July 11806 by G. Kearsley Fleet Street

Engraved by F. Anson

1 *Anemone hortensis*
Star Anemone

2 *Albuca minor*
Lesser Anemone

Double Blush; the White; the Lesser Blush; the Purple; the Blue; the Rose-coloured; the Carnation; the Purple Velvet; the Purple Velvet of three colours; the Double Brimstone; the Green, &c.

In the second sort the stems rise to the same height. According to Haller, the root-leaves are of two kinds; one very deeply gashed, so that they have the appearance of being five-fingered, but are in reality three-parted, the side-lobes being two-parted to the very base; all the lobes are narrow and sharp: the side ones deeply bifid, the middle ones trifid or quadrifid, the extreme ones sharply lanceolate: the other kind broad, deeply three-lobed, blunt, bluntly and shortly serrate at the tip, with an awn standing out. The leaf on the stem, or involucre, is ternate, the leaflets ovate-lanceolate. The peduncle is solitary and one-flowered, as in the first: the petals three times three (in the natural single flowers), long, elliptic, marked with lines, the outer ones subhirsute on the outside, white at the base with green lines. The roots in this as well as the first consist of small tubers.

There are several varieties of this both with single and double flowers: the single and double Yellow: the Purple Starre Anemone, darker and paler; Violet Purple; Purple striped; Carnation; Gredeline, between a peach-colour and a violet; Cochenille, of a fine reddish violet or purple; Cardinal, of a rich crimson red; Bloud-red, of a deeper, but not so lively a red; Crimson; Stamell, near unto a scarlet; Incarnadine, of a fine delayed red or flesh-colour; Spanish Incarnate, of a lively flesh-colour, shadowed with yellow; Blush, of a fair whitish red; Nutmegge, of a dark whitish colour, striped with veins of a blush-colour; Monk's-gray, pale whitish tending to a gray; Great Orange Tawnie; Lesser Orange Tawnie: in the double, the great double Anemone of Constantinople, or Spanish Marigold; great double Orange Tawnie; double Anemone of Cyprus; double Persian Anemone; the common great double Variable Anemone; common double and variegated Scarlet; Red and Purple; variegated of these colours.

The best Star-Anemones are said to come from Brittany, where they raise yearly many fine sorts.

In the third species the root is perennial and creeping. The height of the whole plant from five to ten inches: the stem single, round, and pubescent; bearing one leaf, and one flower. The leaf is doubly ternate; each part being petioled; the petiole is flat and broad, particularly at the base; each part, or leaf (for some consider it as three leaves) is trifid; each leaflet

being cusp-serrate, and hairy underneath, especially on the nerves. The peduncle is from an inch to two inches in length, is only a continuation of the stem, and springs from the centre of the leaf. The flower consists of six or seven oblong-ovate petals, sometimes ending bluntly, sometimes emarginate, and the Editor of Miller's Dictionary has observed them not unfrequently even gashed or lacerate. The usual colour is white, but they are often tinged with purple on the outside, particularly the three outer ones; and sometimes they are entirely purple on both sides. The joint of the stem, and the backs of the leaves are also apt to be tinged with red.

The varieties are: with single flowers, with double white flowers, with single purple flowers, with double purple flowers, and with reddish purple flowers.

In the fourth species the root is perennial and tuberous; the stem round, purplish, and about a span high: the root-leaves on long petioles, ternate, and leaflets usually three-parted; the segments variously cut and divided, somewhat pointed, hairy on both sides; one three-parted leaf, or three leaves together on the stem, like the others, but on short, sheathing petioles. From the centre of these arises the peduncle, about a hand high, round and purplish, except near the flower, where it is green. The stem, leaves, and peduncle, are commonly slightly hairy; the flowers are upright, of a pale blue colour, and sweet smell; the petals oblong, from twelve to fifteen, and disposed in three rows. It flowers in April.

The varieties are: with single blue flowers, with double blue flowers, with single violet-coloured flowers, with double violet-coloured flowers.

The fifth differs from the above in having a yellow corolla, two petals alternately outer, and two inner, and one having one side within and the other side without the next petal; whereas that has three outer and three inner petals: it differs also in the peduncles being accompanied with two leaflets, the latter of which is furnished with three at the base. It flowers a little earlier than the other. It has sometimes two flowers on a stem, though often but one, the peduncles villose and short, so that the flower scarcely rises above the leaves: the petals are five, and roundish; the stamens about fifty. It grows wild in Sweden, &c.

In the Pulsatilla, or Pasque-flower sort, the species are: 1. *A. pulsatilla*, Pasque-flower; 2. *A. patens*, Woolly-leaved Pulsatilla, or Anemone; 3. *A. vernalis*, Early Spring Pulsatilla, or Anemone.

In the first species the peduncles are erect and round, from four to seven or eight inches in height, villose, one-flowered; lengthening after the flowering is past. The involucre multifid, with the divisions linear and villose. It sits close to the flower, but when that is fallen it is found almost in the middle of the peduncle. The corolla specious, and purple in colour; the petals lanceolate, and villose without; the seeds ovate, tailed, hairy, and scarcely adhering to the receptacle: the leaves rough and finely cut, with three or four pairs of pinnae and pinnules. It grows naturally in Sweden, and flowers in April.

The varieties are: with single blue flowers, with double blue flowers, with single and double white flowers, with single and double red flowers, and with violet-coloured flowers.

The second has the root perennial; the root-leaves are ternate-digitate; leaflets sessile, lacinate and acuminate, the middle leaflet tripartite, the side ones bipartite; the scape one-flowered, shorter than the leaves; the involucre remote and villose; the corolla white and villose underneath; the stamens yellow. It is a native of Siberia.

The third species has the flower red without, white within; it blows earlier than the Pasque-flower; the leaves approach those of Meadow-Rue; the stem is half a foot high, with a very tomentose, yellow, shining involucre in the middle, finely cut. When the flower is young, it is white with a blush of purple on the outside, where it is hairy: these hairs afterwards become yellow. The corolla consists of six convergent ovate-lanceolate petals; the stamens are very numerous. It grows in the woods in Sweden, &c.

In the Hepatica kind the only species is the *A. Hepatica*, or Hepatica.

In this the leaves of the year before remain, which are heart-shaped, three-lobed, obtuse, and smooth, beneath being veined in net-work: the petioles are cylindric, long, and rising: the bud has generally four outer scales, ovate and membranaceous; three inner ones, concealing the leaves and flowers; the peduncles three, cylindric, hairy, and one-flowered. The flower lies a year complete in all its parts within the bud. The corolla has six petals in two rows of three each, lanceolate, and spreading: the stamens are about twenty-five: the seeds oblong-ovate, involved in a silky substance; but many of them abortive. It is found wild in Sweden, &c. It flowers early.

The varieties in cultivation are numerous: the single and double blue, single and double red or peach-coloured, single and double white,

single and double variegated red and white, single and double violet-coloured, with striped leaves.

Culture in the Garden kinds.—All the species and varieties of the garden and wood Anemones are capable of being propagated by offsets from, or dividing their roots. By sowing the seed, new varieties may also be obtained.

In order to procure the offsets, and dig over and prepare the beds, the best sorts should be annually taken up immediately on their leaves beginning to decay, as in the early part of June for the more forward sorts. They must then be divided, or have the offset knobs taken off. This work should always be performed in a dry season, the root-bulbs, after the earth has been removed, being deposited on a mat, in an airy dry place, where there is not much sun, being spread out in a thin manner. When they are become quite dry, the remainder of the earth should be rubbed off them, and they may be put up in bags or boxes, and placed in a situation where they cannot be injured by vermin. The roots should not be too much parted where they are intended to flower strongly, and each part should be furnished with a good eye. Where the taking up has been delayed till the roots begin to make new shoots, it will be too late to remove them that season.

In planting the roots or sets thus procured, or which have been purchased from the seedsmen, such situations should be chosen for blowing them in as are free from much moisture, and where the exposure is open to the influence of the sun and air, and free from the shade of trees. They will succeed and flower in tolerable perfection in any soil that is sufficiently light and friable in the mould; but in order to have them blow in the greatest perfection, beds should be prepared with earthy mixtures, made by taking off the surface of such lands as have been long in the state of sward, to the depth of eight or ten inches, where the earth is of the light sandy or hazel mould kind, throwing it up for some time that it may rot and become perfectly mellow; when rotten cow-dung, in the proportion of one-third, should be incorporated with it, by having them thrown up together into a heap, and frequently turned over afterwards; the stones and clods being carefully raked out and reduced; but the earth should not be sifted, as it is apt by such means to become too stiff and compact. Some advise the addition of drift or sea-sand, in the quantity of about one-fourth.

With this earth beds must be formed for the reception of the roots: these should be marked out to the breadth of about three feet and an

half, with length sufficient for the quantity of roots, having alleys between them of from a foot to eighteen inches. The prepared mould is then to be dug or filled in to the depth of twelve or sixteen inches, leaving the surfaces of the beds from three to six inches above the common level of the ground, according to the wetness of the soil, giving them a little convexity when there is much moisture. Some recommend the putting of a layer of well-rotted cow-dung, about five inches in thickness, below the compost materials. The surface of the beds should be raked even before the roots are put in. In planting, six rows should be put in each bed, the roots being set at the distance of six inches from each other in the rows, and to the depth of two or three inches. When this has been done, the surface should be made smooth by raking it over lightly.

The time of planting should vary according to that which it is intended they should blow at. The best season where early flowering is intended is in the latter end of September or the beginning of the following month; for a middle flowering, about the middle of October; and for late flowering, the latter end of February. In this mode of planting a succession of flowers may be provided from April till the middle of June. Those roots that are planted the earliest are in general the strongest, and afford the best flowers, as well as the greatest increase of off-sets. It is always advisable to keep a few roots out of the ground till the spring season, for the purpose of a succession of flowers, and lest the early planted ones should be injured by the severity of the winter, which is sometimes the case where they are not covered to protect them from frost. These spring-planted roots flower a fortnight or three weeks after those which were planted in autumn, and many times blow equally as fair, especially if it prove a moist spring, and care be taken to refresh them gently with water.

But the increase of these roots will not be near so great as in those of the first planting, provided they are not hurt in winter; and it is for this reason that those who deal in these roots are forward in planting; as, although it may sometimes happen, by sharp pinching frosts in the spring, that their flowers are not so double and fair as those planted a little later, yet, if they can preserve the green leaves of the plants from being injured, the roots greatly increase in bulk. But in gardens where these flowers are preserved with care there is always provision made to cover them from the injuries of the weather, by arching the beds over with hoops or frames of wood, and covering them with gar-

den mats or cloths in frosty nights, especially in the spring of the year, when their buds begin to appear: otherwise, if the best and most double flowers be planted, the black frosts and cutting winds in March will often cause them to blow single, by destroying the thrum that is in the middle of the flower;—a circumstance which has often occasioned persons who have bought the roots to think they were cheated, when it was wholly owing to their neglect of covering them.

But, besides this mode, these roots may be planted in borders, clumps, and other places; with much success and effect, in mixture with other plants; in which method three, four, or more roots should be planted together in patches of the breadth of five or six inches, being properly varied in distance and situation. And whether planted in beds or the borders a showery season should be chosen for the purpose, as in dry weather they are apt to become diseased,—proper care being taken to manage the distribution of the colours in such a way as to produce an agreeable variety. They may likewise be planted in pots, where the varieties are curious and valuable, three or more roots being put into each; and by being protected by frames, a green- or hot-house during the winter season, they may be brought forward so as to flower very early and in great perfection.

In the wood sorts the propagation may be effected in the same manner as in the garden kinds; but the sooner the roots are taken up and divided after the decay of the leaves the better. The wild *Anemones* should be taken up when the leaves decline, and be planted out in proper situations.

In raising new varieties of these plants from seed, some of the best and most leafy single, or what are usually termed Poppy *Anemones*, should be provided, and planted out early that they may grow vigorously and afford good seed, which should be carefully collected a few weeks after their flowering is finished. Some, however, procure the seed from the shops. The best time of sowing is probably in August; but some advise the spring, as in March or the following month. This may be performed in boxes, pots, or broad earthen pans, where a small supply of roots only is wanted; but where the demand is great, it is best sown on beds prepared for the purpose. The proper soil or earth for this use is that of the light sandy kind. The seed should be sown as evenly as possible, but rather thick, and be covered by sifting light mould over it to the depth of about a quarter of an inch. The only attention necessary afterwards is that of occasionally shading the plants from

the effects of the sun in hot weather, and giving them a gentle watering now and then. In about six weeks the plants will show themselves, when they should be kept perfectly free from weeds till the leaves begin to decay, when a covering of light sifted mould should be again applied, and another in the autumn may sometimes be required. During the winter they should be well protected from the frosts. In the second summer many of the plants will flower, and the best may be marked by a stick; but none should be destroyed till the third year. At this period the roots will begin to be too thick, and at the decay of the leaves must of course be taken up, which is best done by passing the mould through a fine sieve. And as when sown in beds many roots will be unavoidably left, they should be levelled, and suffered to remain till the following year. The roots that have been separated should be preserved, as before directed, for future planting.

These are all highly ornamental plants, capable of being employed with much effect in pleasure-grounds: many of them are hardy, flower early, and produce great variety in such situations. The wood sorts are very useful in adorning wilderness quarters. The double sorts, when in beds, afford much beauty and variety.

In the *pulsatilla* kinds the propagation may be accomplished either by the seed or dividing the roots. In the first method the seeds should be sown in boxes or pots filled with very light sandy earth, and not covered too deep with mould, which will prevent their rising, as they require no more than just to be covered. The boxes should be placed where they may have the advantage of the morning sun, but be screened from it in the heat of the day; and when the season is dry the earth be refreshed occasionally with water. The best time for sowing is in July or August, soon after the seed is ripened; as by keeping its vegetative power is apt to be destroyed. The boxes or pots should remain in such shady situations until the beginning of October, when they may be moved so as to enjoy the full sun during the winter season. In March, when the plants begin to appear, they should be again removed so as to have only the forenoon sun; for if they are too much exposed to heat the young plants are soon destroyed. They should be refreshed occasionally with water in dry weather, and be carefully kept clean from weeds.

When the leaves are entirely decayed, the roots should be taken up in the manner directed above; and as there will be many small roots left, the earth should either be returned into the boxes again, or spread upon a bed of light earth,

to see what plants may rise the succeeding year. The roots after being thus taken up should be immediately replanted in beds of light fresh sandy earth, about three or four inches asunder; covering them about three inches thick with the same light earth. The spring following most of the plants will produce flowers, but not so large or fair as in the succeeding years. As the roots of these plants are fleshy, and generally run down deep, they will not bear to be kept long out of the ground; therefore, when they are removed, it should be done early in the autumn, that they may take fresh root before the frost sets in.

In this mode of propagation the plants thrive best in loamy soil; as in very light dry ground they are apt to be destroyed by too much heat.

These are plants that afford variety in the borders of pleasure-grounds, especially the first species and its varieties, which are hardy, succeeding in almost any situation.

In the *hepatica* kind the propagation may be effected in the single sorts either by the seed or the parting of the roots; but in the double it can only be done by the latter method. The seed of the single flowers frequently, however, produces double ones. New varieties are likewise raised in the former manner.

In the first method the most proper season for sowing the seeds is in the beginning of August, either in pots or boxes of light earth, which should be placed so as to have only the morning sun until October, when they should be removed into the full sun to remain during the winter season: but in March, when the young plants begin to appear, they must be removed again to a shady situation, and in dry weather be frequently watered; when about the beginning of August they will be fit to be transplanted: at which time prepare a border of good fresh loamy earth, with an eastern aspect; into which remove the plants, placing them about six inches distance each way, closing the earth pretty well to their roots to prevent the worms from drawing them out of the ground. In the spring following they begin to show their flowers; but it is three years before they flower strong, till which time their goodness cannot be ascertained: when if any double flowers, or such as are of a different colour from the common sorts, be found, they should be taken up and planted in the borders, where they should continue at least two years before they are taken up or parted; as it is remarkable in these plants, that where they are often removed and parted they are very apt to die; but when they are permitted to remain some years undisturbed, they grow

rapidly, and become large roots. In propagating them by roots they should not therefore be often parted, or into too small parts.

Double-flowered plants, as they never produce seeds, are only capable of being propagated by parting their roots, which should be done in March, when they are in flower, care being taken not to separate them into very small heads. They should not be parted oftener than every third or fourth year, as they never thrive or blow well where this is the case.

These are plants that display much beauty, affording flowers very early in the beginning of the year. The double sorts are the most ornamental, as the flowers in them are much larger, and continue in blow much longer. These should therefore be placed in the most conspicuous situations in the borders or clumps of pleasure-grounds; but the single kinds deserve places for the sake of variety.

ANETHUM, a genus comprehending different herbaceous annual and perennial plants of the Dill or Fennel kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellales*.

The characters are: that the calyx has an umbel, universal and partial manifold: the involucre neither universal nor partial: the perianth proper obsolete: the corolla universal and uniform; floscules all fertile, proper, five petals, involute, entire, and very short: the stamina have capillary filaments and roundish anthers: the pistillum is a germ inferior: the styles approximating, obsolete: the stigmas obtuse; no pericarpium: the fruit subovate, compressed, striated and bipartite: the seeds are two, subovate, margined, convex, and striated on one side, flat on the other.

The species cultivated are: 1. *A. graveolens*, Common Dill; 2. *A. faeniculum*, Fennel.

In the first there is much resemblance to Fennel; but it differs from it in having an annual root, a smaller and lower stem, seldom exceeding three quarters of a yard: the leaves being more glaucous, and of a less pleasant smell: the seeds broader, flatter, surrounded with a membranaceous rim, and of a less pleasant flavour: the umbels of flowers yellow, but smaller than those of Fennel. It has a peculiar strong aromatic smell. It is an annual plant.

The second species rises in height from three to five or six feet: the stem is upright and very smooth: the leaves finely cut; leaflets capillary: the umbels very large and hollow: the corollas yellow; petals equal: the fruit ovate-oblong: the seeds have five ribs on the back, but no mem-

brane round the edge as in the Dill. It is a native of Germany. It flowers in July, and the seeds ripen in autumn.

There are several varieties of this plant, Linnæus mentions four; but Miller has only the three following: Common Fennel; Sweet Fennel, and Azorean Fennel, or Finocchio. The first variety has a strong fleshy root, which penetrates deep into the ground, and will continue several years. It flowers in July, and the seeds ripen in autumn.

In the second variety the leaves are very long and slender, growing more sparsely, and do not end in so many points as those of the first sort. The stalks do not rise so high, and the seeds are longer, narrower, and of a lighter colour. Though supposed a variety by some, others have found it always retain its differences under cultivation. The third variety has very short stalks, which swell out just above the surface of the ground, to four or five inches in breadth, and nearly two in thickness, the part being fleshy and tender, so as to be eaten when blanched and prepared as a cold salad.

If the plants be allowed to run up for seeds, the stems seldom rise higher than a foot and a half in height, having a large spreading umbel on the top. The seeds are narrow, crooked, and of a bright yellow colour: they are very sweet, and have a strong Aniseed smell.

Culture.—The propagation of these plants is easily effected by the seed; which in the Dill and Finocchio must be sown annually, as they only endure one summer. A little space of ground is sufficient for the supply of a family of any of these plants; but particularly the Fennel, as it lasts several years. They will succeed in almost any soil or exposure.

In the *Dill*, the cultivation may be either in shallow drills, at eight or ten inches asunder, or broad-cast over the surface, the plants being afterwards set out by the hoe to proper distances, as eight or ten inches. The seeds may be sown either in the autumn or spring; but the former is the best season, as they succeed the best, and grow with the greatest vigour. They require no trouble while growing, only to be thinned as above, and kept clear from weeds. The first thinning may be performed in May, when they are advanced a few inches in height.

When the seeds begin to be formed, which is mostly about the latter end of July, the umbels should be gathered for the purpose of being used in pickles, with cucumbers, &c. Where the seeds are wanted they must stand till fully ripened.

In the *Fennel* the culture may either be in drills at eighteen or twenty inches apart, or by

sowing the seed broadcast, and setting them out afterwards to twelve or eighteen inches distance each way. The best season for sowing is the autumn. The plants will furnish plenty of leaves for use the first year, but more abundantly the second, and continue for several seasons afterwards by cutting down and clearing away the old stems every autumn. The young plants of this sort may likewise be transplanted into beds in the summer or autumn, as occasion may require; and they may also be increased by slips from the roots; but this is not so good a way as by seeds.

In the cultivating of *Finochio*, care should be taken to procure good seeds, which for the first crop should be sown in March; and occasionally for successions till July. These sowings should be performed in drills at the distance of two feet from each other, set out by means of a line, the seeds being scattered in and covered with fine earth to the depth of half an inch. When the plants are risen to the height of a few inches the weeds should be hoed out, and the plants afterwards occasionally thinned to the distance of eight or ten inches. In this way there will be sufficient room for the bases of the stems to swell out in. After the stems have begun to swell out and distend themselves, they should be carefully earthed up when perfectly dry, on both sides, in order that the bulbous parts may be blanched and rendered tender, which is mostly effected in the course of a fortnight or three weeks. The late or autumn crop should be protected from the frosts by being covered with peas-halm, or any similar covering.

A light rich soil is the most suitable for this plant.

A small bed of this sort of plants will be sufficient for a family.

ANGELICA, a genus comprising several herbaceous perennial plants of large growth.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellales*.

The characters are: that the calyx is an universal umbel, manifold and roundish, partial, and when flowering exactly globular: the involucre universal, three or five-leaved and small, partial, eight-leaved and small: the perianthium proper, five-toothed, and scarcely observable: the corolla universal and uniform: the floscules all fertile, partial, having five equal petals, lanceolate, flattish, incurved and caducous: the stamina consisting of simple filaments longer than the corolla: the anthers simple: the pistillum an inferior germ: the style reflex: the stigmas obtuse; no pericarpium: the fruit

roundish, angular, solid, and bipartite: the seeds two, ovate, flat on one side and margined, convex on the other and scored with three lines.

The species of most importance are: 1. *A. archangelica*, Garden Angelica; 2. *A. lucida*, Shining Angelica; 3. *A. atro-purpurea*, Purple Angelica.

In the first the root is thick, branched, and very long, being brown on the outside and white within: the leaves pinnate, with the extreme leaflet three-lobed; universal umbel copious, rays sixty, angular, partial globular; involucre frequently one-leaved; involucre many-leaved, ten, linear, reflex: the petals ovate, acute, greenish or pale purple, caducous: the filaments white: the fruit elliptic, swelling, lens-shaped, slightly emarginate at both ends, grooved and winged, whitish or pale straw-colour, splitting into two seeds, which are convex on one side, with a stiff marginal wing, and three on the back similar to it; flat on the other side, with a single raised longitudinal streak. It is a native of the northern parts of Europe, and flowers with us from June to August.

The second species has the whole plant smooth: the root biennial: the stem from a foot to two feet in height, the thickness of a finger at least, round, sometimes straight, sometimes flexuose, branched, hollow, striated especially towards the top: the leaves bipinnate, rising from a large, striated sheath: the root-leaves tripinnate: the leaflets lanceolate or ovate, the outmost confluent with the next pair: the umbels and umbellules convex and close; rays striated; universal involucre of about five narrow-lanceolate, mucronate leaflets: the leaflets of the partial involucre are about as many as there are outer rays of the umbellule; they are subulate and acuminate: the petals of a dirty whitish or very pale yellow colour: the anthers twin and yellowish; seeds brown, of a hot aromatic flavour, with little smell. It flowers in June, and the seeds ripen in August. It is a native of Canada.

In the third species the stem is six feet high, fistulous and jointed, polished, and of a dark purple, with a glaucous bloom: the common petioles sheathing, streaked, partial compressed and channelled: the leaflets oblong and suboblate, with the serratures white at the tip, veined, naked, pale underneath, and mostly sessile: the umbels three, terminal; sheaths two, opposite, purple and leafy at the top; common peduncle round, partial angular, or furrowed; proper polished: it has no involucre. Involucres with twelve subulate leaflets, the length of the um-

bellute, which is hemispherical: the petals incurved, shorter than the stamens, ferruginous without, purple within: the receptacle and stamens green: the seeds convex and three-keeled. It is a native of North America.

Culture.—The propagation in all the sorts may be easily effected by means of the seeds. The first sort succeeds the best in such soils as incline to moisture. The proper time of sowing is in the autumn, soon after the seeds have become perfectly ripe, as when sown in the spring they seldom answer well, the vegetative power being much destroyed. The sowing is usually performed in the broadcast method, being afterwards well raked in. When the plants have attained the growth of six or seven inches in height, they are in a proper state to be transplanted, which should be done to a considerable distance, as twenty inches or two feet or more. They grow well on the banks of ponds.

In the first year after planting leaves are only produced; but in the second they run up to stem, flower, and perfect their seed. If it be the intention to continue the plant, the stems must be cut down in the spring, by which they may be perpetuated for three or four years. Where the object is seed, new plantations must be annually made, as in seeding the plants are only biennial.

A plant or two may be proper in pleasure-grounds, for the sake of variety.

ANGELICA-TREE. See ARALIA.

ANISEED TREE. See ILLIRIUM.

ANNONA, a genus comprehending plants of the deciduous and evergreen tree, and shrubby kinds. The Guanabus, or Custard-apple, and Papaw-tree.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Coadunatæ*.

The characters are: that the calyx is a three-leaved small perianthium: the leaflet cordate, concave and acuminate: the corolla consists of six petals, cordate and sessile: the three alternate interior ones less: the stamina have scarcely any filaments: the anthers are very numerous, placed on the receptacle: the pistillum is a roundish germ, placed on a roundish receptacle; no styles: the stigmas obtuse and numerous, covering the whole germ: the pericarpium is a very large, roundish, one-celled berry, clothed with a scaly bark, or a compound berry: the seeds very many, hard and ovate-oblong, being placed in a ring, nestling.

The species of most importance are: 1. *A. reticulata*, Netted Custard-Apple; 2. *A. muricata*, Rough-fruited Custard Apple, or Sour Sop; 3. *A. squamosa*, Undulated Custard-

Apple, or Sweet Sop; 4. *A. tripetala*, Broad-leaved Custard Apple; 5. *A. palustris*, Shining-leaved Annona, or Water-Apple; 6. *A. triloba*, Three-fruited Annona, or Papaw-Tree; 7. *A. Asiatica*, Asiatic Custard-Apple.

The first is a tree which grows to the height of twenty-five feet or more, with spreading branches: the bark is smooth and of an ash colour: the leaves are of a light green colour, and have several deep transverse ribs, ending in acute points: they are alternate in two rows, elongate, broad, rounded at the base, acuminate with a blunted tip, entire about the edge, veined, smooth on both sides: the petioles gibbous, short, excavated and smooth: the flowers three or four close together, peduncled, nodding, whitish, the same size as in the third: the petals three, linear, thick, three-cornered, blunt, unequal and brown on the outside, yellowish white within, spotted with dark purple, excavated at the base: the nectary consists of three very minute, oblong, blunt petals, at the base of the genuine petals: the body of the stamens and pistils is roundish, minute and whitish: the fruit is roundish, heart-shaped, the rind sometimes reticulate, thick, brown, shining. It is of a conical form, according to Miller, and as large as a tennis-ball, of an orange colour when ripe, having a soft, sweet, yellowish pulp, the consistence of a custard, whence the name. It is a native of both the East and West Indies.

The second species is a middle-sized tree, rarely above twelve or fourteen, or at most twenty feet high: trunk upright, with stiff, round, smooth branches, and a brownish ash-coloured bark; leaves petioled, alternate, sparse, oblong, acuminate, entire, shining, firm and stiffish: the petioles short: the peduncles axillary, solitary, thick, longer than the petioles, one-flowered: the flowers coriaceous and yellow: the calyx one-leaved and triangular: the corolla three-petalled: the petals acuminate, thick, concave, coriaceous, smooth, scabrous on the outside, and pale green: the nectary three-leaved: the leaflets alternate with the petals, only half the size, subcordate, smooth, convex and yellow: the filaments scarcely any: the anthers rather pedicelled, subelavate, bivalve and whitish: the styles very short, and crowded together into a conical form: the stigmas oblique and hirsute after flowering-time: the berry difform, cordate-oblong, mucicate with prickles bowed back and fleshy: the seeds oblong, black, with a lateral scar of a different colour, and placed in a ring. It produces a large succulent fruit. It is a native of the West Indies.

The third species is a small tree, about eight

feet in height, and is frequently rather a shrub: the trunk is smooth, and the branches spreading and round: the leaves alternate, acuminate, entire, nerved, smooth on both sides, glaucous on the back: the petioles short, round, smooth, thickened at the base: the flowers peduncled, usually in pairs, oblong, acuminate, green without and whitish within: the peduncles below the petioles, longer and one-flowered: the calyx one-leafed and triangular: the petals three, lanceolate, triquetrous, plane-convex without, sharp at the tip, excavated within at the base, dark purple, smooth: the nectary none: the filaments scarcely any: the anthers imbricate, pressed close to the germ, obtuse and two-valved: the styles short, thick and imbricate: the stigmas oblong and oblique: the berry oval: the scales adnate, roundish, blueish, resembling subimbricate teats: the seeds flattened a little, black with a white scar on the side, wrapped in a succulent cottony substance. It is a native of both the East and West Indies. The fruit is sweet, and eaten in those countries.

The fourth sort grows to a very large tree in South America, and is well furnished with branches: the leaves are bright green, much larger than those of any other species: the fruit is oblong, scaly on the outside, and of a dark purple colour when ripe: the flesh is soft and sweet, and has many brown seeds intermixed with it, which are very smooth and shining. It is esteemed by the Peruvians as one of their most delicate fruits.

The fifth species is a small tree, only a fathom in height, or little more: the branches round, scabrous, ash-coloured: the twigs smooth, alternate and patulous: the bark tenacious, and may be drawn out into long threads for making ropes: the leaves are petioled, alternate, spreading, ovate, scarcely acuminate, entire, beautifully nerved, very smooth, coriaceous, and a little recurved: the flowers peduncled, towards the ends of the branches: the peduncle solitary, the length of the petioles, round, one-flowered, below the petiole, smooth: the flower yellow, the same size as in the second: the calyx three-parted, almost triangular: the petals three, concave, roundish with a short point, thick, coriaceous, veined on the outside, smooth and paler on the inside, with blood-red spots at the base: the nectary consists of three petals, shorter by half than the three others, narrower, acute, concave, white without, dark blood-red within: the filaments crowded, fixed to the receptacle below the pistil: the anthers oblong, angular, blunt and white: the germs crowded into a convex, green body: the styles scarcely any: the stigmas blunt, pale: the berry heart-shaped,

very smooth, with a coriaceous, pulpy rind. It is native of Jamaica. It is known by the name of *Alligator Apple*, and, from the softness of the wood, *Cork-wood*.

The sixth has the trunk seldom bigger than the small of a man's leg, and rises about ten or twelve feet high, having a smooth, greenish-brown bark. In March, when the leaves begin to sprout, its blossoms begin to appear, consisting each of six greenish-white petals. The fruit grows in clusters of three, and sometimes four together: they are at first green, and when ripe yellow, covered with a thin smooth skin, which contains a yellow pulp, of a sweet luscious taste; in the middle of which lie in two rows, twelve seeds, divided by so many thin membranes. All parts of the tree have a rank, if not a fetid smell. It is observed by Miller that this is rather a shrub than a tree, and that the flowers in this country are of a rusty purple colour.

The seventh is a middle-sized tree, with spreading branches: the leaves quite entire, alternate, petioled: the flower pale, single on binate peduncles: the petals three, oblong-conical, incurved and erect: the germs superior, uniting, as they ripen, into an oblong-conical berry, five inches long, red and smooth on the outside, filled with a whitish, sweet, eatable pulp, but inferior in flavour to the third sort. It is a native of the East Indies.

Culture.—All these plants are capable of being raised from seeds. In the more hardy kind, as the sixth species, the culture may be effected by seeds procured from North America, which should be sown in the autumn in pots of light rich earth, and sheltered during the winter season by means of a green-house for two or three years, when the plants may be turned out of the pots, and placed in the open ground in warm screened situations in the spring, for the purpose of remaining. As the seed of this sort is very slow in vegetating, if the plants do not appear the first year, the mould in the pots should not be disturbed, for they frequently come up afterwards. Their vegetation, however, proceeds much quicker when the pots are protected in the house in the winter season, and plunged in a gentle hot-bed in the early spring.

In the tender sorts the propagation is best effected by sowing the seeds in pots of rich light mould in the autumn, and placing them in a bark hot-bed under glasses about February. When the plants are risen to the height of three or four inches they should be pricked out into other separate pots, a little water given them, and then plunged into the bark bed, being after-

wards placed in some part of the stove where they must constantly remain. They should then be carefully managed, and have plenty of air admitted, as without this they are apt to become sickly. When the plants become large they must be shifted into pots of greater sizes; but care should be taken not to overpot them, being still kept in the bark boat. The heat should be kept up to that of the Anana, as marked on botanical thermometers. And the tan in the beds should be frequently turned over and refreshed. They should also have water frequently in summer in small quantities; but in winter more sparingly, a little once a week in mild weather, and once in a fortnight or more when frosty, may be sufficient.

The hardy sort casts its leaves in winter; but those of the tender kinds retain them, their chief beauty in this climate depending upon their green foliage, as they but seldom flower or produce fruit. The fruit in the hardy sort is different from that in the tender kinds, two or three growing together at the foot-stalks of the leaves.

The hardy sort is highly ornamental in the pleasure-ground, and the tender kinds in the stove.

ANNUAL PLANTS. Such plants as are of one year's growth and duration, continuing for the summer season, or only a few months. In general, however, all such plants as rise from seed sown in the spring, arrive at maturity in the summer or autumn following, producing flowers and ripe seed, and which afterwards perish in their tops, stems, and roots, are considered as annuals. The last effect takes place in most sorts in the autumn and winter following; though some hardy kinds, when late sown, are capable of standing over the winter until the ensuing spring, especially those of the esculent sorts; but very few of the flowering kinds remain longer than October or November, unless protected by a green-house, garden-frame, or some covering of that nature.

Plants of this tribe are numerous, as most of those of the herbaceous kind, consisting of uncultivated plants, weeds, &c., and also a number of cultivated garden and field plants, both of the esculent and flowery ornamental sorts belong to it. The latter kind are often simply termed annuals. They are likewise very extensive, and of various kinds, some of which, from the peculiarity of their nature, and others from their producing beautiful flowers, are cultivated for the purpose of ornament in flower-gardens and pleasure-grounds.

The annual flowering plants are distinguished

by gardeners into *hardy* and *tender* sorts: the former are such as can be raised from seeds sown on beds, borders, or other places, in the natural or open ground; the latter, such as constantly require to be sown on, and have in some degree the aid of, hot-beds, to promote their perfect growth.

Hardy Annuals.—These constitute a numerous assortment of flowering plants, fit for being cultivated in the natural ground. The following are some of the principal of them: *Adonis*, or *Adonis Flower*.—*Alkekengi*, white-flowered, blue, yellow-berried, red-berried.—*Amaranthus*, *Prince's Feather*, *Love-lies-bleeding*, purple.—*Alysson*, white, sweet-scented.—*Amethystea*, blue.—*Balm*, Maldivian.—*Beldere*, or *Summer Cypress*.—*Calandula*, or *Cape Marigold*.—*Candy Tuft*, white-flowered, purple, large, white, crimson.—*Catch-fly*, Lobel's red-flowered, white, purple.—*Caterpillar*.—*Clary*, red-topped, white-topped.—*Convolvulus*, three-coloured minor, minor blue and white, minor blue, major blue, great white, great striped blue, great purple, red.—*Cyarus*, or *Blue-bottle*, blue-flowered, purple, white, red, striped blue and white.—*Cucumber*, sporting.—*Devil in a Bush*, blue-flowered, white, nettle-leaved.—*Fumitory*, yellow.—*Hawk-weed*, yellow, red.—*Hedge-Frog Trefoil*, snail-shaped, prickly, turbinate, globular, orbicular, long crooked-twisted.—*Honey-wort*, great, less.—*Holly-hock*, Chinese variegated, double-flowered.—*Jacobæa*, or *Rag-wort*, purple-flowered, white.—*Indian Corn*, tall-growing dwarf.—*Kidney-beans*, scarlet runner, dwarf scarlet, large white runner.—*Ketmia*, bladder.—*Larkspur*, upright blue, upright purple, upright white, upright rose-coloured, white rocket, rose rocket, dwarf rose rocket, dwarf white rocket, dwarf blue rocket, dwarf red rocket, branching, blue branching, white branching, double and single-flowered of all the different sorts.—*Lavatera*, Cretan red-flowered, white, purple.—*Lupine*, dwarf yellow, large yellow, white, great hairy blue, great hairy rose-coloured, narrow-leaved blue.—*Lychnis*, dwarf.—*Marigold*, double orange-coloured, double yellow, double lemon-coloured, gold-coloured, parti-coloured, yellow, ranunculus-flowered, childing, or profliferous, Cape Marigold.—*Mallow*, curled-leaved, oriental.—*Mignonette*, odoriferous or sweet-scented.—*Nasturtium* major, or large-growing, minor or dwarf.—*Nolana*, Peruvian dwarf blue.—*Nigella*, or *Devil in a Bush*.—*Pansy*, or *Heart's Ease*, common, small, variegated, large Dutch variegated, large purple, yellow, purple and yellow, purple, yellow, and white.—*Peas*, sweet-scented, purple, white, painted lady, scarlet,

Tangier.—*Pea*, winged, pea crown, white-blossomed crown, painted lady crown, rose-coloured.—*Persicaria*, oriental, red-flowered, white-flowered, poppy, large double purple, double red, white variegated, red and white spotted carnation, dwarf red, dwarf purple, dwarf variegated, double and single of all the different sorts.—*Queen's Balm*.—*Scabious*, purple, sweet, red-flowered, white-striped, hen-and-chicken-flowered, stony-flowered.—*Snail Trefoil*.—*Stock Gilliflower*, ten weeks, purple-flowered, red, white, scarlet, dwarf, French, wall-flower-leaved, white.—*Stock Virgin*, purple, white.—*Snap-Dragon*, annual, with white flowers, purple flowers, major or greater, with red flowers, purple, white, yellow, scarlet, red and white, purple and white, red and yellow, white and red, yellow and red, yellow and white, scarlet, gold-dotted.—*Strawberry Spinach*, sunflower, annual, tall-growing dwarf, double-flowered of each sort.—*Sweet Sultan*, purple, red, white, yellow.—*Toad-flax*, three-leaved yellow, three-leaved purple, three-leaved blue, variegated, white, branching yellow, *Tobacco*, hardy round-leaved, Virginia long-leaved, Virginia broad-leaved.—*Virginia*, or *Virgin Stock*.—*Venus's Looking-glass*, purple, white.—*Venus's Navel-wort*, blue-flowered.—*Xeranthemum*, or *Eternal Flower*, red, white, purple, double-flowered.

The usual season for sowing all these sorts of plants is in the spring, from the middle or latter end of February to the middle or latter end of April, for the principal blow; and in May and the following month for successional and late flowering, especially those of the quick flowering kinds, which are of short duration.

The manner of sowing these sorts is principally in little patches or clumps. These patches should be formed from about three or four, to five, six, or eight inches in diameter, at moderate distances, and in some sort of regularity, towards the front, middle, and back parts of the borders or beds, and also in a varied manner in respect to the plants; the smaller growing sorts being constantly sown more or less towards the fronts of the borders, according to their degrees of growth, and the larger kinds more backwards in the same proportion. Some may likewise be occasionally sown in pots; in all of which, each sort and variety should be in separate patches, &c. from a quarter of an inch to half an inch or an inch in depth, or little more, according to the sizes of the different sorts of seeds; being careful to loosen and break the earth a little, so as to render it fine for each patch, especially if hard, stubborn, or cloddy; then drawing off a little depth of mould,

according to circumstances, to one side, sow the seeds many or few together in the patches, proportionately to the sizes of the plants, covering them regularly with the earth drawn aside to the depth required; and proceed in this manner, always placing a small short stick or some other mark to each patch as the sowing is performed, in order to distinguish the places in which they have been put in. Some may also be occasionally sown in drills, either in beds separately, or in the borders.

After sowing, if it be dry warm weather, it will be beneficial to give occasional light waterings, both before and after the plants are come up, especially during their more early growth. And when they are come up about an inch or two in height, those in the patches will, in many of the large tall sorts, require thinning.

In the advancing growth of the plants, the principal culture necessary is to keep them clean from weeds; and where any large sorts remain too close, or crowded together, to thin them according to their growth; and in the larger tall-growing kinds, to support them with sticks, as also most of the climbing or trailing sorts.

If it be required to have any desirable sorts of these annuals of moderate growth to flower early, they may be forwarded by sowing the seeds in pots in February or March, and placing them in a hot-bed, or more successfully in a hot-house, &c.

As all the plants of this tribe generally produce plenty of ripe seed in autumn, care should be taken to save proper supplies of the different best sorts, as they ripen in perfection, in order to have plenty for sowing the ensuing spring.

Tender Annuals.—This class comprises various tender curious flowering plants, mostly raised in hot-beds. The principal of them are contained in the following list:—*African Marigold*, orange-coloured, lemon-coloured, deep yellow, fistulous or quilled, waved-flowered, dwarf, sweet-scented, double-flowered of each sort.—*Amaranthus*, *greater or tree, *bloody-trailing, or love lies bleeding.—**Balsam*, red, scarlet, purple, striped, variegated, double.—**Basil*, common, greater, upright, sweet, with broad-leaves, fringed-leaved, purple-leaved, tricolor-leaved, red-flowered, purple-flowered, long-spiked, &c. least, or bush Basil, with hoary leaves, dark purple-leaved, variable-leaved, &c.—*Calendula*, or Cape Marigold.—**Capsicum*, long-podded, short-podded, heart-podded, bell-podded, angular-podded, cherry-podded, olive-podded, red-podded, scarlet-podded, yellow-podded.—*Chinaaster*, blue-flowered, purple, red, white, striped, variegated, bonnet-flowered, quilled-flowered, double and single of each sort.

—*Chinese Holly-hock*, variegated, double.—*Chrysanthemum*, yellow, white, cream-coloured, sulphur-coloured, fistular or quilled, double and single of each sort.—*Convulvulus*, major, with deep purple flowers, red, blue, white, deep blue.—*Cucumber*, snake-shaped.—**Egg Plant*, or *Melongo*, white-fruited, purple-fruited.—*French Marigold*, deep yellow, golden yellow, crimson-coloured velvety, crimson and yellow-striped, variegated crimson and yellow, sweet-scented dwarf, double and single of each sort.—*Gourd*, orange, pear-shaped, striped pear-shaped, lemon top-shaped, bottle or calabash buckler-shaped squash, carbuncled, warted, long taper, long crooked, horn-shaped, large barrel-shaped, large globular, large oval, hemispherical, yellow, stone-coloured, flesh-coloured, sandy-coloured, parti-coloured, white, &c.—**Globe Amaranthus*, purple-headed, white, variegated, silver-spiked.—*Indian Corn*, tall-growing, dwarf.—*Indian Pink*, bright red, purple, white, red and white variegated, differently variegated, numerous, large imperial, double and single of each sort.—**Love-Apple*, red-fruited, yellow-fruited, cherry-shaped.—**Marvel of Peru*, red-flowered, yellow, white, purple, striped, long-tubed-flowered.—**Melon*, snake-shaped, serpent cucumber.—*Mignonette*, sweet-scented.—*Nolana*, trailing blue.—**Palma Christi*, major, or tall-growing, minor or lesser, most broad-leaved, lesser-leaved.—*Persicaria*, oriental, red-flowered, white.—*Sultan Flower*, yellow.—*Stock Gilliflower*, ten weeks, red, purple, white scarlet, dwarf scarlet, dwarf white, wall flower-leaved white, wall flower-leaved purple, double of each sort.—*Tobacco*, Virginia long-leaved, Virginia broad-leaved.—**Tree Amaranthus*.—**Zinnia*, red-flowered, yellow-flowered.

In respect to the culture of the more tender annuals, they should be either sown in a moderate hot-bed in March or April, and the young plants forwarded a little in growth therein till settled warm weather in the middle or latter end of May, and then transplanted out, or sown in a bed of natural earth, or warm border, in April, protected under a garden frame, or glasses, or at least defended in cold nights by garden mats; and in either method transplanted in May or beginning of June into beds, borders, pots, &c. in the flower and pleasure-garden, for flowering in summer and autumn. But where the convenience of a hot-bed is attainable, it is always advisable to raise a principal supply by that means for early transplanting and flowering, as portions of the different sorts may be sown and raised in the same hot-bed, making the bed or beds in March or the beginning of April, and

defending them with a frame and lights, hand-glasses, or other means, in cold nights and bad weather. A moderate hot-bed of about two feet thick in dung will in this case be sufficient, earthing-it at top, five or six inches deep, with fine rich mould; in which sow the seeds in small drills crossways, drawn with the finger two or three inches asunder, from half an inch to an inch in depth, according to the size of the different sorts of seeds, which should be sown regularly, each sort separately, and covered in evenly with the earth the same depth, giving them air occasionally in the day-time; and, as they advance in growth, admitting gradually a larger portion to strengthen and harden them, occasionally giving also gentle waterings. Continue the care of the young plants in this manner until advanced two or three inches in growth, when it will be proper to prick out a quantity of the principal sorts into another moderate hot-bed, three, four, or five inches asunder, and others into natural beds of light earth, under frames and glasses, or to be defended occasionally by mats. They may however in general be pricked out in the middle or latter end of May into natural beds in the open ground; being watered at the time, and afterwards occasionally; and shaded with mats from the sun, if convenient, till the plants have taken fresh root; observing also to give those in the hot-beds and under glasses less or more air every mild day.

When in three, four, or five weeks, in either of these beds, they have acquired a tolerable degree of strength and size, as four, five, or six inches growth or more, according to the difference of the sorts, they should all be finally transplanted about the latter end of May and beginning of June into the open ground on the beds, borders, and other compartments, or into pots, to remain for flowering, taking the opportunity of moist weather, if possible, for the work. Where convenient, some sorts should be replanted, with a little ball of earth adhering about the roots, as it will be of great advantage in their more early flowering; watering them as soon as planted out, and afterwards as occasion may require till freshly rooted, and they discover signs of a renewal of growth.

Where any of the plants have remained in the seed-bed not pricked out, as they may probably have drawn one another up into a weakly growth, care should be taken to plant them out in May, as soon as the weather is settled and favourably temperate, especially the more tender kinds that are marked with an asterisk.

Ten-week Stocks and Mignonette may be sown in a hot-bed so early as February, or any time in March, in order to raise a few plants to

prick out into pots, three or four in each, for the earliest flowering; or some may be sown in March in the natural earth, or a warm border, under glasses, or other occasional shelter, for early transplanting in April or May into pots and flower-borders, &c.

In the gourd kinds, when designed to raise them in hot-beds, they should not be sown before April; for if sown earlier they are apt to grow too large before the season becomes sufficiently warm to admit of planting them out in the open ground; but in the beginning or middle of May, some may be sown in the natural ground, both for transplanting and in patches to remain.

But where hot-beds, frames, glasses, and other similar conveniences are not at hand, many of the species and varieties of this class, as has been seen, may be raised in the open ground, especially, if not generally sown till the beginning, or towards the middle or latter end of April, according to the state of the season, sowing them on a warm border, or other protected situation, in good light mould, or in pots of light earth in similar situations. In these cases, when the plants are properly advanced, they should be pricked out into beds, or planted out where they are to remain, in the latter end of May or beginning of June. These often flower in tolerable perfection, though not so early, or in so fine a manner as in the hot-bed method. In finally setting out the plants in May or the following month, much advantage is derived by performing the work in a moist season; and when balls of earth can be preserved round the roots, they will succeed the better in many of the sorts. The planting may be executed with a trowel or dibble, according to circumstances; and the larger sorts set out singly, and the whole in a diversified manner, according to their nature. In some of the smaller sorts, setting several together may be preferable, as producing a better effect when in flower: water should be given at the time of planting them out, and occasionally till they have taken fresh root. In the after culture they chiefly require to be kept clear from weeds, supported in their growth by proper sticks, and properly turned up in some of the sorts. The potted plants will require frequent watering in dry weather, when set out in their different situations.

Most of the plants of this tribe are in flower in June and July, frequently continuing till September or the following month, and are highly ornamental; but there are some that are curious for the appearance of their fruit.

As most of the kinds produce seeds in autumn, care should be taken to provide proper

supplies of such as is well ripened from the best flowering plants of the different kinds; which, when rendered perfectly dry, should be put up in bags for the purpose.

Tenderest Annuals.—The plants of this class are not so numerous as the above, but more ornamental and curious, and more tender in their nature; they are chiefly the following:—*Amaranthus*, tricolor, bicolor, maximus or tree *amaranthus*, bloody, &c.—*Balsamine* or *Balsam*, double-striped, double scarlet, double purple, double bizarre.—*Browallia*.—*Cock's Comb*, tall purple-headed, dwarf purple, crimson, buff-coloured, yellow, branching.—*Convolvulus*, scarlet.—*Egg Plant*.—*Globe Amaranthus*.—*Humble Plant*.—*Ice Plant*, or Diamond *Ficoides*, oval-leaved, pinnatifid-leaved.—*Marvel of Peru*.—*Martynia*, purple-flowered, red, white.—*Melon*, snake-shaped.—*Stramonium*, double, white, double purple, double striped.—*Sensitive Plant*, double-flowered annual, common shrubby, humble.—*Zinnia*, varieties of.

These very tender annuals must all be raised on hot-beds in the spring till May or June, under frames; and to obtain them in a tolerable degree of perfection, two different hot-beds, at three, four, or five weeks intervals, will be necessary for sowing and raising them in; one the latter end of February, or any time in March, but not later than the beginning of April: the young plants, when about one, two, or three inches in height, being pricked out, some into small pots singly, others in the earth of the bed, three or four inches asunder, the whole being in the same bed if there be room enough, if not into another hot-bed; and when they have advanced in growth, so as to crowd one another, they should be removed into another hot-bed, under a deeper frame, or the frame raised at bottom occasionally, as the plants rise in height. Some should be put into large pots, and others potted that were not so before, plunging the pots in the earth of the bed; or some may be put in the bed, six or eight inches asunder; water is then to be given, in general, and the glasses put on. The whole from their first growth must have an admission of fresh air every day by raising the upper end of the glasses one, two, or three inches, supplying them with moderate waterings. In this way they may be forwarded until the latter end of May or some time in June, according to their growth, or the temperature of the season, as before suggested; but in the mean time, in their advancing state, inure or harden them by degrees to the weather, particularly by gradually admitting a larger share of air, or by sometimes taking the glasses off entirely in warm days, &c.

The humble and sensitive plants should, in general, be continued constantly under glasses in a green-house, &c. or in a room window within, in the full sun, as, if fully exposed to the open air, it would deprive them of much of their lively sensitive motion; in which curious singularity, as has been observed, their principal merit consists.

But in order to raise some of the more curious sorts of this kind of annuals in the greatest perfection, it will be necessary to have three different successional hot-beds under frames and glasses, at a month's interval; that is, a small one in March, to sow the seeds and raise the plants on an inch or two high; a second in April of larger dimensions, in which to prick out the young plants from the seed-bed, three, four, five, or six inches asunder; and a third in May, for a larger frame to receive them when transplanted in pots, to remain till June, and they grow to the full size. While they are in the second and last hot-beds, the frames should be occasionally raised or augmented in depth, according as the plants rise in height.

The first hot-bed for the seed should be made, as already directed, of suitable dimensions, and about two feet and a half deep in dung; the frame and glasses then put on, leaving one end of them open, to let out the rank steam of the dung; and in a few days, or when the first great steam and heat of the bed is gone off, the earth, which must be rich, light, and dry, should be put on, four or five inches thick. The seeds of different sorts may now be sown, each kind separately, in small shallow drills, drawn with the finger, covering them with fine mould, from a quarter to half an inch deep, or with the very small seeds but very thinly. The glasses are then to be put on again, setting one end of them a little open, for the evaporation of the rising steam of the bed, covering them every night with garden mats. The plants mostly appear in a few days, when fresh air must be judiciously and with caution admitted, by propping up the ends of the glasses about an inch or two every mild day; and when the earth becomes dry, a very slight sprinkling of water should be given in a sunny forenoon. The glasses should mostly be kept close in the nights; but if a strong steam and heat take place, they may be raised a little at one corner, for air to enter, and the steam to pass away, hanging the end of a mat over the tilted part, and continuing to cover the glasses with mats every night.

The care of the seedling plants is to be continued in this manner in the beds for about three weeks, or till they are advanced one, two, or

three inches in growth, according to the different sorts; they are then to be pricked out into another new-made hot-bed.

This hot-bed should be put in readiness to receive them, making it for a two-or three-light frame, according to the quantity of plants that are ready for the purpose. When the bed has imparted a proper degree of warmth to the earth, take up the plants with care, and in the same manner as directed above, pricking them out into this, four or five inches distant, then giving them a very light watering, and occasionally shading them in the middle of sunny days till they have struck fresh root; and admitting air as before every fine day, by raising the upper ends of the glasses one or two inches; also occasional light waterings two or three times a week in warm weather, and defending them in the nights with mats, raising the frames, according as they extend in height, as before advised. After having had four or five weeks growth in this bed, if they have advanced considerably, so as to meet and crowd one another much, it will be advisable, as already noticed, to remove them into a third and final hot-bed, where it can be conveniently obtained; some being planted in the bed, others previously potted and then placed in it, to be covered by glasses, as directed above.

The frames, glasses, or other conveniences for these uses, should be sufficiently large, especially for the tall plants, and capable of being raised at pleasure as they advance in growth. The other management being the same as directed above. (See *Hot-bed*.)

ANTHEMIS, a genus furnishing several species of annual and perennial plants of the herbaceous kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoidææ*.

The general characters of which are: that it has a common, hemispherical calyx, consisting of numerous, linear, subequal scales: the corolla compound, with radiate florets in the disk, hermaphrodite and tubular; those in the radius female, and more than five: the former are funnel-shaped and five-toothed. In the hermaphrodite florets the filaments are five, capillary, very short, supporting cylindrical, tubular antheræ: the germen oblong: the style filiform: stignas two, reflex: the seeds solitary: the receptacle chaffy, and convex.

The species of most importance for the purpose of garden culture are: 1. *A. nobilis*, Common or Sweet Chamomile; 2. *A. maritima*, Sea Chamomile; 3. *A. tomentosa*, Downy Chamomile.

mile; 4. *A. tinctoria*, Yellow Chamomile; 5. *A. pyrethrum*, Spanish Chamomile, or Pellitory of Spain.

In the first species the root is perennial: the stems trailing, and hairy: the leaves bipinnate, pinnae rather distant, pinnules sometimes with two or three clefts, pointed, hairy, grayish: the flowers solitary: the calyx hairy, with broad, shining, membranaceous edges: florets of the circumference somewhat elliptical, either entire, or with two or three teeth; those of the centre yellow. Abundant in Cornwall. It flowers in July and August.

In the second the stems are widely prostrate, smooth and purplish: the leaves pinnate, gashed, naked, sprinkled with hollow dots, towards the base more closely toothed, under the base with a transverse raised purplish line: the peduncles terminal, solitary, substriated, pubescent, thicker towards the top: the flowers have the smell of Feverfew. It is a native of France and Italy; and flowers in July and August.

In the third species the stems are a foot high, one-flowered, and the leaves tomentose-silky: the two outer divisions of the corolla larger than the others. It is a native of the coasts of Greece, Italy, &c.

In the fourth the stem is striated, slightly hairy, and much branched: the lower leaves pinnate; lower pinnae short, distant, and toothed; upper pinnatifid, the midrib broader than the pinnules, which are lanceolate, toothed, slightly hairy, green above, and glaucous underneath: the upper leaves pinnatifid; midrib broad; pinnae irregular, linear-lanceolate, toothed; uppermost leaves sometimes simply toothed, slightly hairy: long, naked, striated, slightly hairy peduncles terminate the stem and branches, each bearing one flower: the calyx imbricate with numerous scales; outer of various lengths, inner equal, lanceolate, hairy, with a green dorsal line, and white shining edges: florets all yellow, those of the radius broad, three-toothed; of the disk numerous, short. It is a native of Sweden.

In the fifth the stems are many, prostrate, usually one-flowered, seldom branching: the root perennial, thick, running down a foot or more into the ground, about as big as a man's finger, the colour of horse-radish, white within, of an acrid biting taste: the flower large, the florets of the ray purple on the outside. It is a native of the Levant, and the southern parts of Europe.

The sixth species is a low shrubby plant, having the leaves pinnatifid at the top: the peduncles elongate: the calyxes membranaceous,

with a barren ray. It is a native of the Cape of Good Hope; and flowers from April to June.

Culture.—The first sort, or Common Chamomile and its varieties, may be easily propagated by parting the roots, by offsets, by slips, and by cuttings of the extending branches. This may be done in the summer season; but the best time is in March or the following month. They may be planted in beds, a foot asunder, to afford room for their spreading.

The variety with double flowers has a good effect when set in the borders, in small bunches.

The other species are capable of being raised from the seeds by sowing them in the spring season, on beds of common mould. They should be afterwards transplanted when sufficiently strong into the situations where they are to remain. In the fourth sort this is advised by Martyn to be done on "large open borders, near shrubs, where they may have room to grow, for they require to be three feet distant from other plants. In large open spots they make a pretty variety from June to November, during which time they continue in flower. Some of the flowers are white, others sulphur-coloured, and others of a deep yellow. Those which come from the Levant are taller plants, and produce larger flowers; but in other particulars they are the same with the European." They are likewise all capable of being propagated by cuttings and slips from the branches in the summer season, in shady borders or other places. In any of these methods they must be transplanted, when sufficiently rooted, into the fronts of the clumps, borders, and other parts of shrubberies, and other parts of pleasure-grounds. In these situations they flower annually, and continue several years. The last species is too tender to withstand the effects of the open air without protection in the winter season.

ANTHERICUM, a genus including plants of the herbaceous flowery Spider-wort kinds.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla consists of six, oblong, obtuse, very spreading petals: the stamens are subulate, erect filaments: the antheræ small, incumbent, and four-furrowed: the pistillum is a germ obscurely three-cornered: the style simple, and of the length of the stamens: the stigma obtuse, and three-cornered: the pericarpium an ovate, smooth, three-furrowed, three-celled,



Painted by Syd Edwards

London Published July 1st 1845, by G. Kearsley Fleet Street

Engraved by F. Simpson

1 *Anthericum Lilastrum*
Savoy Anthericum

2 *Amaryllis formosissima*
Jacobean Amaryllis

Digitized by Google

and three-valved capsule: the seeds numerous and angular.

The species are numerous, but those that most deserve cultivation are: 1. *A. revolutum*, Curled-flowered Anthericum; 2. *A. ramosum*, Branching Anthericum; 3. *A. elatum*, Tall Anthericum; 4. *A. Liliago*, Grass-leaved Anthericum; 5. *A. Liliastrium*, Savoy Anthericum, or Spider-wort; 6. *A. frutescens*, Shrubby Anthericum; 7. *A. alooides*, Aloe-leaved Anthericum; 8. *A. asphodeloides*, Mock Asphodel, or Glaucous-leaved Anthericum.

In the first the roots are fleshy, and composed of tubers joined at the crown, like those of the Asphodel: the stalk rises near two feet high, and branches out on each side; each branch being terminated by a loose spike of flowers, which are white, and the petals are turned backward to their peduncle. And according to Murray, the root-leaves are numerous, only one-third of the height of the scape, subulate, channelled at the base, then keeled and flat, striated, an inch and half broad, and spreading: the scape four feet high, almost naked, round, smooth and oblique: the bractes five, gibbous at the base, pressed close, subulate, the lower ones larger like the leaves, the upper ones scaly and shrivelling: the corymb terminating, compressed, having six round, long, alternate branches, knotted where the flowers spring forth: the flowers alternate, solitary, or two sometimes three together, on small gray pedicels, thicker at the top, each supported by a little subulate bracte: the corolla inferior: the petals lanceolate-ovate, reflex, obtuse, concave at the tip, white, except towards the end on the outside, where they are brownish green: the filaments a little shorter than the corolla: anthers erect, oblong, revolute as they wither: the root similar to that of the *Haemanthus puniceus*. It is a native of the Cape of Good Hope.

In the second species the root is round, and the stalks rise about the same height as the former, sending out many lateral branches in like manner, which are terminated by loose spikes of flowers: the leaves are hard and grassy, none on the scape, which is loosely panicled, with one-flowered peduncles: the corollas white: the petals flat, and not turning back as in the former sort: the three outer petals narrower than the others, lanceolate and sessile: the three inner oval and petioled. In each angle of the germ a small melliferous pore. It is a native of Sweden, &c. The flowers watch from seven in the morning to three or four in the afternoon.

The third has the roots composed of many tubers, each about the size of a little finger at

top, and diminishing gradually to the size of a straw: the leaves from seven or eight, to nine or ten inches in length, and an inch and half broad in the middle, lessening gradually to both ends; they are smooth and glaucous: the flower-stem about two feet high, dividing into several branches, having a few narrow leaves, generally one at every division of the branch: the flowers form a loose spike, and are white. This plant has been lately recovered from seeds which were sent from the Cape to England and Holland. It usually blows in August and September.

In the fourth species the roots are numerous, round, and collected into a tuber crowned with bristles: the leaves from the root many, firm, a foot long, carinated and grassy: the scape erect, eighteen inches high, firm: the spike loose, ten-flowered, and the peduncles simple: the flower two inches wide; petals in two ranks: the inner widest, petiolate and pure white: the outer have a green line running along beneath. It is a native of Italy, &c.

The fifth species has the root fascicled, with fleshy fibres. It has the corolla of the white Lily: the leaves grassy, soft, broader than two lines, the radical ones very long: the scape a foot or eighteen inches high: the spike thin-set with spreading flowers, on simple peduncles: the stipules coloured, ovate-lanceolate: the corolla above an inch in diameter, gradually widening; petals tender and white; ovate, thin, lanceolate, with a reflex point, which is thicker and has a green dot: they are marked with lines, and sweet-scented: the stamens almost as long as the petals, with weak filaments. In France it is called St. Bruno's Lily.

There are two varieties of this, one with a flower-stalk more than a foot and half high, the other with the stems much the same: the flowers are much larger in the former, and there is a greater number upon each stalk than in the latter. It is a native of Switzerland and Savoy.

The sixth species differs from the seventh by rising into a stem and branches, by having the leaves greener, longer, and narrower, with a firmer pulp, and a viscid juice flowing copiously from them when cut, of a greenish yellow colour: the root is fibrous, and not only the stem, but even the branches put out fibres, which hang down, and when they reach the ground strike root. It is a native of the Cape of Good Hope, and was formerly known by the name of Onion-leaved Aloe.

The seventh has broad, flat, pulpy leaves, resembling those of some sorts of Aloe, and was formerly on that account called Aloe with flowers of Spiderwort. The leaves spread open, are broader and more translucent, soft and pulpy,

than the above, pouring out a limpid juice : the root is tuberous : the flowers are produced on loose spikes, like the former, but are shorter ; they are yellow, and appear at different seasons. This species grows close to the ground, never rising with any stalk. It is a native of the Cape of Good Hope.

The eighth has the leaves scarcely striated, but rough at the edge ; more gibbous at the back towards one side ; they are long, narrow and pulpy, almost taper, but flattened on their upper side : the flowers are yellow, and grow on long loose spikes as the former ; these appear at different seasons ; those of the spring and summer are succeeded by seeds in great plenty, which ripen. It is a native of the Cape.

Culture.—These perennials are in general capable of being propagated by the roots, offsets and suckers ; but as some of the species do not supply them in sufficiency, they may be raised from the seeds.

In the first method the best season for the purpose is in the latter end of summer and beginning of the autumn, in beds of light vegetable earth in warm open situations, free from the shade and droppings of trees. An eastern aspect, where the plants are properly shaded from the sun in the mid-day, is preferable for some of the sorts, as they keep longer in blow and beauty.

This is likewise the proper period of transplanting, as when the business is performed in the spring the plants seldom flower the same year. This should not be done oftener than once in about three years, where increase is intended ; and in the execution of the work the roots should not be too much divided, as when that is the case they do not flower well.

In the second method, or that by sowing the seeds, the best season is probably the spring, though they may be sown in the autumn. A bed of good light vegetable mould is the best for the purpose, and the situation should be sheltered and warm. The plants soon appear, and when their leaves begin to decay in the autumn they should be taken up carefully, and transplanted out into another bed of the same sort of earth, at the distance of from nine inches to a foot from each other. When the winter season is severe they should be protected from the frost by a thin covering of tan or some other substance. In this situation they should continue for about twelve months, when they will in general be sufficiently strong for flowering. In the following autumn they must of course be taken up without injuring the fibres of the roots, and be planted out in the clumps, borders, or other places where they are to remain. As they are

apt to be destroyed by frost in the winter season, care should be taken to protect them as much as possible.

The Cape sorts are capable of being raised by seeds : but this is seldom necessary, as they multiply greatly by offsets and suckers ; which may be taken off at the period mentioned above, and planted out in pots of good bog earth, a very small portion of water being given, as much is apt to rot and destroy the roots. As these are tender plants they require the constant protection of a green-house stove or frames during the winter season. In these situations they should be managed with great attention and care.

ANTHOLYZA, a genus comprising plants of the ornamental herbaceous perennial bulbous-rooted tribe. It is sometimes termed *Æthiopian Corn-flag*.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatae*.

The characters are : that the calyx is a two-valved alternate imbricate spatha ; the corolla one irregular ringent petal, tubular below, widening gradually to a large compressed ringent mouth : the upper lip straight, slender, and very long and erect, with two short wings at the base : the under lip shorter and trifid : the stamina long slender filaments under the upper lip, and pointed antheræ : the pistillum a germ below the corolla : the style slender, and a trifid stigma : the pericarpium a trigonous capsule of three cells, and many triangular seeds.

The species principally cultivated are : 1. *A. ringens*, Narrow-leaved Scarlet Antholyza ; 2. *A. plicata*, Plaited-leaved Antholyza ; 3. *A. cunonia*, Scarlet-flowered Antholyza ; 4. *A. Æthiopica*, Æthiopian Crimson Antholyza ; 5. *A. meriuna*, Red-flowered Antholyza ; 6. *A. merianella*, Dwarf Antholyza.

The first has round, red, bulbous roots, from which arise several rough furrowed leaves, near a foot long, and half an inch broad ; between these comes out the flower-stem immediately from the root, which rises two feet high, is hairy, and has several flowers coming out on each side : these are of one leaf, cut into six unequal parts at the top ; one of these segments is stretched out much beyond the others, standing erect : the margins are waved, and closed together, wrapping up the three stamens : the flowers are of a red colour, and appear in June ; the seeds ripen in September.

The second species differs from the first in its appearance, and especially in not having the stamens so long : the leaves are long, narrow, and deeply furrowed, lapping over each other :

the flower-stem rises to the height of eighteen inches, and the flowers are ringent.

The third has a compressed bulbous root, covered with a brown skin, and putting forth fibres with little bulbs at the end; from this arise several narrow sword-shaped leaves, about nine inches long, and a quarter of an inch broad in the middle, terminating in acute points; these have one longitudinal midrib which is prominent, and two longitudinal veins running parallel on each side: they are of a sea-green colour, and appear in autumn, growing in length all the winter; in the spring the stalk arises from between the leaves, is round, strong and jointed; at each joint is situated a single leaf, which almost embraces the stalk for near three inches from the base, being then separated by the curvature of the stalk, standing erect: the stalks rise near a foot and a half in height, and are generally curved two opposite ways; the upper part being terminated by a loose spike of flowers, coming out of large spathes, composed of two oblong concave leaves, terminating in acute points: these are at their first appearance imbricated, but as the stalk increases in length they are separated; from between these two leaves come out the flowers, each having a slender saffron-coloured tube near half an inch long, which is then enlarged where the petal is divided, and the upper segment is extended two inches in length, being arched over the stamens and style: this is narrow as far as to the extent of the wings, but above them is enlarged and spread open half an inch in length, and is concave, covering the anthers and stigmas, which are extended to that length; the two wings are also narrow at their base, but are enlarged upward in the same manner, ending in concave obtuse points, which are compressed together, and cover the stamens and style: the flower is of a beautiful scarlet colour, and appears about the latter end of April or beginning of May.

In the fourth species the corolla is tubulose and of a scarlet colour; upper lip very large, lanceolate; lower five-parted, the lobes lanceolate, short, three alternately very short: the leaves are long and of a deep green: the flower-stem is round and a foot in height: it flowers in May and June.

In the fifth the root is bulbous, compressed, and shaped like a kidney, covered with a fibrous brown skin: the leaves sword-shaped, about a foot long, and an inch broad, ending in points: the two sides have sharp edges, but the middle is thicker, and has a prominent mid-rib; they are of a dark green colour, and rise immediately from the root: the stalk comes out from the root between the leaves, and rises a foot and a

half high: the flowers are produced from the side, standing alternately at about an inch and a half distance from each other; they have each a spathe composed of two leaves which are joined at their base, where they are broad, but gradually lessen to their points: before the flowers appear, they are of the same green colour with the stalk, and are divided but a small part of their length, inclosing the flower, but are afterwards split almost to the bottom, and wither before the flowers decay, becoming dry round the seed-vessel: the tube of the flower is an inch and a half long, narrow at the base, and a little curved, the upper half swelling much larger: the rim is divided into six obtuse segments which spread open, and are nearly equal: the flower is of a copper red colour on the outside, but of a deeper red within; it has three stamens a little longer than the petal; they are incurved, and terminated by oblong anthers of a dark brown colour, which are fastened in the middle to the apex of the stamens, lying prostrate: the flowers appear in April or May, and the seeds ripen in July.

The sixth species has the root bulbous: the culm a foot and half high, polished and columnar: the leaves alternate, three or four, sheathing, sword-shaped, streaked, pubescent, beyond the sheaths short, rarely more than six inches long: the flower-stalk rises between the leaves, about nine inches in height: the flowers three, alternate, in the same row, sessile: the glumes bivalve and lanceolate: the corolla salver-shaped: the tube bent, purplish, longer than the border, which is six-parted and equal: the divisions ovate, acutish and yellow: the stamens rising, the length of the corolla: the anthers linear and incumbent: the style filiform: the stigmas three, filiform: the flowers are large and pale red.

Culture.—These plants are capable of being raised with success, either by means of the divided roots and off-sets, or the seeds. In the latter method the seeds should be sown soon after they are ripe, as when they are kept out of the ground till the following spring they often miscarry, or remain long in the ground before they vegetate. If they be sown in pots of light vegetable earth, and plunged into an old tan-bed which has lost its heat, and shaded in the middle of the day in hot weather, they mostly come up the following winter. They must of course be kept covered with glasses to screen them from cold, otherwise the young plants will be destroyed. These should remain in the pots two years, if the plants be not too close, by which time they will have attained sufficient strength to be planted out into separate small pots filled with light vegetable earth.

The best time of transplanting these roots is in July or August, when their leaves begin to decay. In summer the pots should be placed in the open air, but in winter removed, and placed under hot-bed frames, as they are not very tender: where damp exists the leaves are apt to become mouldy. The roots send forth shoots in autumn, the flowers begin to appear in May, and the seeds ripen in August. When the third sort is raised in this way the seeds should be sown in pots about the middle of August, and placed in situations where they may enjoy the morning sun, being gently watered in dry weather. In September the pots may be removed to a warmer situation, and in the following month placed under a frame, to be protected from frost and hard rains, but in mild weather exposed to the free air. The plants appear in October, and continue growing all the winter: their leaves decay in June, when the roots may be taken up and planted out in pots.

In the latter mode, or that by means of offsets, which is mostly practised with the third, fifth, and sixth species, the best season of planting out the roots is in the latter end of summer or beginning of autumn. In the third species the method recommended by the Editor of Miller's Dictionary is to plant the roots out "in pots filled with light earth, to remain in the open air till October, when they must be removed into shelter, either into an airy glass-case, or placed under a hot-bed frame, where the leaves keep growing all winter, and in the spring the stalks arise and flower. During the winter season the plants require a little water when the weather is mild, once a week, but it must not be given in great quantities, especially in cold weather: in the spring they should be watered oftener; and when the flowers are past the pots should be removed into the open air to perfect their seeds, which will ripen the latter end of June, soon after which the stalks decay to the root. When the stalks are decayed, the roots may be taken out of the ground, and kept in a dry room till the beginning of autumn, when they should be replanted."

The roots of the fifth and sixth sorts are directed to be planted, when the leaves are decayed, in separate pots filled with light fresh earth, and placed in the open air till toward the end of September, when the leaves begin to appear above ground, at which time remove them into shelter, as the plants require protection from the frost: they should not, however, be treated in too tender a manner. The best method is probably that of plunging the pots in an old bark-bed that has lost its heat in the beginning of autumn, covering it with glasses, which should be

drawn off daily in mild weather to admit free air. About March or April, when the flower-stems begin to shoot, they should be removed to a glass-case or good green-house to stand for flowering, after which free air should be admitted to perfect the seed. Two or three small roots may be planted in a pot, according to the size, and have the same management as the large ones the first season, and in the second have separate pots.

Some of these plants are highly ornamental, but from their tender nature require the protection of the stove or green-house.

ANTHOSPERMUM, a genus comprising plants of the shrubby green-house Amber Tree kind.

It belongs to the class and order *Polygamia Diœcia*, and ranks in the natural order of *Stel-latæ*.

The characters are: that the male calyx is a one-leaved conical perianthium, quadrid beyond the middle: the divisions ovate-oblong, evolute, obtuse, and a little coloured; there is properly no corolla: the stamina consist of four capillary filaments, erect, the length of the calyx, and inserted into the receptacle: the antheræ twin, oblong, four-cornered, obtuse and erect. In the female the calyx and corolla are the same: the pistillum an inferior, ovate, four-cornered germ: the style recurved: the stigmas simple.

The species are: 1. *A. Æthiopicum*, Smooth Amber Tree; 2. *A. ciliare*, Ciliated Anthospermum; 3. *A. herbaceum*, Herbaceous Anthospermum.

In the first the male flowers are borne on one plant, and the hermaphrodite flowers on another: its beauty chiefly consists in its small evergreen leaves, which grow as close as heath, and being bruised between the fingers emit a very fragrant odour. The stem is low, but erect and branching.

In the second species the root is perennial and woody: the branches many, scarcely dividing: the leaves narrow and lanceolate; the flowers axillary and sessile: the calyxes four-parted, and the stamens four in number.

In the third species the stalks are herbaceous, diffused, roundish, red and smooth: the branches opposite: the leaves are in whorls, sessile, lanceolate, smooth, and one-nerved: the flowers axillary.

All the species are natives of the Cape.

Culture.—The propagation in these plants may be effected by layers or cuttings, which in the latter case should be made from the young shoots or branches, and planted in pots of good light sandy earth in the early summer months,

a slight portion of water being given, and the pots plunged in a moderate hot-bed. In this way they soon strike root. They may also be raised in beds of light earth, but not so certainly. Proper shade is necessary in both cases. When removed, a ball of earth should be preserved about their roots. They should be placed in a good dry green-house during the autumn and winter seasons, in an open situation, and have occasional slight waterings. Fresh air must also be admitted as much as necessary, as when kept too close they do not succeed well. As these plants do not continue long, they should be frequently renewed by cuttings.

The first species is an ornamental shrubby plant, which has a very pleasing smell.

ANTHYLLIS, a genus containing several herbaceous and shrubby plants.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*, or *Leguminosæ*.

The characters are: that the calyx is a one-leaved, ovate, oblong perianthium, swelling and villose: the mouth five-toothed, unequal and permanent: the corolla papilionaceous; the banner longer; the sides reflex; and the claw the length of the calyx: the wings oblong, shorter than the banner: the keel compressed, the length of the wings, and similar to them: the stamina consist of rising connate filaments: the antheræ simple: the pistillum is an oblong germ: the style simple and ascending: the stigma obtuse: the pericarpium a roundish legume, concealed within the calyx, very small and bivalve: the seeds one or two in number.

The species are numerous; but those cultivated are: 1. *A. barba Jovis*, Silvery Anthyllis, Jupiter's Beard, or Silver Bush; 2. *A. cylindroides*, Downy-leaved Anthyllis; 3. *A. hermannica*, Lavender-leaved Anthyllis; 4. *A. erinacea*, Prickly-leaved Anthyllis.

The first is a shrub which often grows ten or twelve feet high, and divides into many lateral branches, with winged leaves, composed of an equal number of narrow leaflets, which are very white and hairy; the flowers are produced at the extremities of the branches, collected into small heads; these are of a bright yellow colour, and appear in June; sometimes they are succeeded by short woolly pods, containing two or three kidney-shaped seeds; which, except the season prove warm, do not ripen in this country. It is a native of the south of France, &c.

The second species is a low shrub, seldom rising above two feet in height, but sends out many slender branches, with hoary leaves, which are sometimes single, but generally have three oval leaflets, the middle one being longer than

the other two: the flowers are yellow, and come out from the side of the branches, three or four joined together, having woolly calyxes, rarely succeeded by seeds in this climate. It is a native of Spain.

The third is a shrub that grows five or six feet high, the branches garnished with oblong, ternate leaves: the flowers, which are yellow, produced in small clusters on the side of the branches; these appear in July and August, but are not succeeded by seeds in this country. It grows naturally in Greece.

The fourth species is a shrub nine or ten feet in height, which has the appearance of one sort of Gorse. It is covered with spines; at the origin of the branches, an ovate scale; leaves oblong-ovate, nappy, three generally next the flowers. It grows naturally in Spain, &c.

Culture.—The method of propagation in the shrubby sorts is either by means of the seeds or by cuttings. In the former mode the seeds should be sown in the autumn in pots filled with light vegetable earth, and protected during the winter season by frames or a green-house. The young plants appear in the following spring; and when they become of pretty strong growth they should be transplanted each into a separate pot of the same sort of mould, being shaded till they have taken fresh root, when they may be placed in some warm situation in assemblage with other hardy exotics till the beginning of autumn, when they must be removed under shelter.

In the latter method the cuttings should be planted out during the summer months on good light earth, being shaded and lightly watered until they have stricken root, when they should be transplanted into separate pots, and managed in the same way as the seedling plants.

The last species is only capable of being propagated by seeds; but is so hardy as to succeed in the open air in mild winters. Frost must however be guarded against, as it soon destroys the plants.

These are ornamental plants for the green-house, and other places about the house during the summer season.

ANTIRRHINUM, a genus including various plants of the herbaceous flowery tribe, commonly known by the titles of *Snap-Drum*, *Calf's-Snout*, and *Toad-Flax*, or *Frog's-Mouth*.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a five-parted permanent perianthium: the divisions

oblong, the two lowermost gaping: the corolla is monopetalous and ringent: the tube oblong, swelling, and opening above with a mouth having two lips, the upper one two-parted and reflex on each side, the under one trifid and obtuse: the palate convex, usually closed by a prominence between the lips, produced from the under lip, the throat being concave beneath, having a prominent nectarium at the base of the corolla, produced downwards and prominent: the stamina consist of two short and two long filaments, inclosed under the upper lip; the antheræ converging: the pistillum a roundish germ, style simple, of the length and in the situation of the stamens: the stigma obtuse: the pericarpium a roundish capsule, obtuse, two-celled, of different form and aperture in the different species: the seeds numerous: the receptacles uniform, solitary, and affixed to the partition.

The species of most importance for cultivation are: 1. *A. linaria*, Common Yellow Toad-Flax; 2. *A. cymbalaria*, Ivy-leaved Toad-Flax; 3. *A. triphyllum*, Three-leaved Toad-Flax; 4. *A. purpureum*, Purple Toad-Flax; 5. *A. Montpellierianum*, Montpellier Toad-Flax; 6. *A. sparteum*, Branching Toad-Flax; 7. *A. triste*, Dark-flowered Toad-Flax; 8. *A. pelisserianum*, Violet-coloured Toad-Flax; 9. *A. multicaule*, Many-stalked Toad-Flax; 10. *A. Alpinum*, Alpine Toad-Flax; 11. *A. Dalmaticum*, Dalmatian Shrubby Toad-Flax; 12. *A. genistæfolium*, Broom-leaved Toad-Flax; 13. *A. majus*, Great Toad-Flax, or Snap-Dragon; 14. *A. bellidifolium*, Daisy-leaved Toad-Flax, or Snap-Dragon.

The first species has a hard woody creeping perennial root: the stems several, from one to two feet in height, full of leaves, round and smooth: the leaves pointed, smooth, and of a blueish colour, growing without order: the flowers yellow with the palate orange, villose, in a thick terminal spike: the nectary long and awl-shaped: the upper segment of the calyx a little longer than the rest: the two lower ones gaping, widest: the capsule cylindric, splitting at the top into several equal divisions. It grows by road-sides, and flowers from June to August. By culture the flowers become larger and finer.

The second species has a fibrous perennial root, inserting itself so into the crevices of walls and rocks as scarcely to be eradicated: the stalks are numerous, growing in a tuft, creeping at bottom, branched, round, purplish and stringy: the leaves roundish, shining, somewhat fleshy, some opposite, others alternate, frequently purplish: lobes of the lower ones blunt, upper acute, the smallest only three-lobed: the pe-

tiocles long and grooved above: the peduncles from the axils, one-flowered, round, a little longer than the petioles: the tube of the corolla short: the upper lip purple, with two deeper veins; segments of the lower whitish: the palate yellow: the mouth or entrance into the tube villous and saffron-coloured: the nectary purple and conical, the length of the calyx: the germ purple: the capsule wrinkled, opening at top into several segments: the seeds are black, roundish and wrinkled like the nut of the walnut. The whole plant is smooth, but has a disagreeable smell.

There is a variety with a white flower.

The third is an annual plant, which rises with an upright branching stalk near a foot and half high, with oval, smooth, gray leaves, placed often by threes, and sometimes by pairs, opposite at the joints; the flowers grow in short spikes at the top of the stalks; they are shaped like those of the common sort, but have not such long tubes; they are yellow, with saffron-coloured chaps. It flowers in July and August, and the seeds ripen in autumn. It grows naturally in Sicily.

There are varieties of this with a purple standard and spur; and with purple flowers.

In the fourth species the root is perennial: the stem two feet high, round and smooth: the leaves smooth, and marked with three nerves underneath, spreading, alternate: the lower verticillate: the racemes are terminal, simple, erect, long, with pedicels longer than the flower: the calyx minute: the corolla all purple, paler without, with the palate pubescent at the edge; spur the length of the corolla, bending outwards: the capsule subglobular: the seeds three-sided-angular, or a little compressed: the angles acute, margined, smooth, and vermicularly wrinkled between them; the colour of smoke. It is a native of Italy.

The fifth has a perennial root, from which arise many branching stalks near two feet high, with very narrow leaves growing in clusters, and of a grayish colour. The flowers are produced in loose spikes at the end of the branches; they are of a pale blue, and have a sweet smell. These appear in June; and there is often a succession of flowers on the plants till winter: the bractes are lanceolate, one at the base of each peduncle: the corolla pale blue, with darker spots; spur nearly as long as the body of the corolla: the calyx very small, and the segments acute.

In the sixth species the stem is a foot high, quite smooth, panicled, erect, but not very stiff, with wand-like branches. Primordial leaves, before the stalk shoots up, ternate, oblong; the rest alternate, awl-shaped, channelled, smooth,

fleshy, and straight; the flowers are racemose: the calyxes smooth, or rather somewhat villose: the corollas yellow: the palate smooth, with a tinge of red in the retuse elevation of it.

The seventh has several smooth stems, eight or nine inches long, usually decumbent: the leaves rather fleshy, convex and glaucous: the calyx and bractes only pubescent: the corolla very dark purple, with the spur streaked: it often varies of an ash, yellow, or lighter purple. By Curtis it is said to be of a fine rich brown inclining to purple: the capsule is shaped like the human skull. It is a native of Spain, and flowers during most of the summer months.

The eighth species has an annual root: the stem six or eight inches high, erect, round, very smooth, branching a little: the leaves very remote, rather fleshy and smooth: the radical or lower ones three or four together: the flowers in a head or corymb, and small: the calyx erect, not close, but with distant divisions: the corolla purple, with a white palate marked with obscure veins, purple: the upper lip longest; spur straight, as long or longer than the corolla. It is a native of France, &c.

The ninth is an annual plant, from whose root proceed many stalks, which are lax and rushy, very slender, and about a foot in height; on the lower part they have five very narrow, linear, obtuse leaves at each joint; but upwards they are sometimes by pairs, and sometimes single: the stalks are divided into many small branches, with little yellow flowers coming out singly at a distance from each other, which appear in July, and ripen their seeds in August. It is a native of Sicily.

There are two varieties of this plant, one with a deep yellow-coloured flower, the other with a sulphur-coloured flower.

In the tenth species the root is perennial: the stems slender, branching at bottom, growing thicker towards the top, from two to seven inches long, ascending, round and smooth: the leaves quite entire, without veins, and thick; the lowest smaller, and in fours: the upper ones solitary, or two opposite, or sometimes three: the flowers in a close raceme at the ends of the stalks; they are very elegant, of a fine violet purple colour, with a rich gold colour in the middle, and are in blow most part of the summer. It is a native of the Alps.

The eleventh species rises with a strong woody stalk, three feet high, having smooth, spear-shaped leaves, placed alternately, and sitting close to the stalk. The flowers are produced at the end of the branches in short loose spikes; these are of a deep yellow colour, much

larger than those of the common sort, and stand upon short foot-stalks. It flowers in July, but the seeds rarely ripen in this climate, which makes the plants scarce. It is a native of Crete, &c.

The twelfth is a biennial or perennial plant, which rises with an upright, branching stalk from three to four feet high, having spear-shaped, alternate leaves, ending in acute points, and of a grayish colour. The flowers are produced at the end of the branches, in loose panicles; they are of a bright yellow colour. It is a native of Siberia, &c.

In the thirteenth the root is biennial: the stem from a foot or eighteen inches to two and even three feet in height, upright, round, solid, smooth at bottom, but pubescent higher up: the leaves are lanceolate or ovate, blunt, the lower mostly opposite, the upper inclined to be alternate: the flowers in a spike, pointing one way, large and handsome, on a very short, hairy peduncle, supported by a short, concave, acuminate bracte: the nectary obtuse, scarcely prominent: the capsule obliquely opening at top, unequal at the base; vulgarly compared in shape to a calf's head: the tops of the stalks and the calyxes are usually viscid. It is a native of the south of Europe, and flowers in June and July.

There are a great many varieties, as with red, yellow, purple and white flowers, red with white or yellow mouths, white and red, yellow and red, yellow and white, purple and white, purple with yellow mouths, with scarlet dotted with gold colour, with double flowers, and variegated leaves.

The fourteenth species is a biennial, or at most a triennial plant, which frequently perishes soon after the seeds are ripened. The stem is erect, two feet high, branching, terminated with a long thin spike: the stem-leaves small and three-parted, sometimes five-parted, very different from the broad, serrate, radical ones: the bractes one-flowered, linear, long, sometimes trifid: the flowers very small, on short peduncles, in a very long raceme, containing frequently an hundred flowers: the segments of the calyx almost capillary: the corolla blue, nodding, quinquefid, two of the divisions erect, three nodding; throat open without any palate; spur short, bent back: the anthers reflex, dark blue. It is a native of Spain, &c.

Culture.—In most of the plants of the Toad-Flax kind the propagation may be readily effected by sowing the seeds either in the autumn or the spring, in situations where they are to remain, and where the soil is light and not enriched by manure. The seeds of the third, sixth and ele-

venth species are best put into the ground in the spring; and those of the fourth, fifth, eighth and ninth in the autumn. The first species may be increased by the trailing stalks which put out roots from the joints. It will succeed in any soil or situation. The fourth and fifth species may likewise be propagated by parting the roots. The seventh and tenth may be raised by cuttings, which should be planted out in a shady situation in the summer season, and when they have taken good root they may be removed into pots of light earth of the poorer sort. The striped varieties must also be propagated by cuttings, in the same way as the above.

The plants raised by cuttings should be sheltered during the winter months, fresh air being admitted freely in mild weather. When protected under a hot-bed frame they succeed better than in the green-house, as in the latter situation the plants are apt to be drawn up weak.

The plants raised from seed should be removed into pots, of light sandy earth, especially in the eleventh species, till they have taken fresh root, being then exposed in assemblage with other hardy exotic plants till October, when they should be placed in a hot-bed frame to be protected from frost. Some may likewise be planted out in warm situations on rubbish or poor sandy soils, where they will frequently stand in mild winters, as in such situations they resist cold the best.

In the Snap-dragon kind the propagation may be accomplished either by the seed or by cuttings. When the former method is practised, the seeds in the thirteenth species should be sown in the spring, as in April or May, in the places where they are to remain, where they will produce flowers in the following spring. But in the fourteenth species the seed should be sown in the autumn on borders or other places, where they are to remain. They must be thinned in the following spring, and they mostly flower in the second. If the former of these sorts be designed to grow on rocky barren situations, the seeds should be sown in March, where they are to remain.

Where the latter mode is employed, the cuttings should be made in the summer season, and planted out in a proper shade till they have stricken root.

These are most of them plants adapted to the purpose of ornament, either in rocky barren situations, or in the borders, clumps or other parts of gardens and pleasure-grounds. The first species is particularly suited for covering rock work, and the thirteenth also grows well in such situations, and it as well as most

of the other species is adapted for the purpose of affording variety in the larger borders or other compartments. They last the longest in dry poor rocky situations.

APIUM, a genus comprehending different herbaceous biennials for culinary use.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal umbel of fewer rays, or partial of more: the involucre universal small, of one or more leaflets, or partial smaller: the perianth proper and obsolete: the corolla universal and uniform: the floscules almost all fertile: the petals proper, roundish, inflex and equal: the stamina consist of simple filaments: the antheræ roundish: the pistillum an inferior germ: the styles reflex: the stigma obtuse; no pericarpium; fruit ovate, striated, and splitting in two: the seeds two, ovate, striated on one side, and plane on the other.

The species according to Martyn are: 1. *A. petroselinum*, Parsley; 2. *A. graveolens*, Smallage.

In the first the stems are round, smooth, striated. Usually there is one leaflet at the origin of the universal umbel, and an involucre of from six to eight short folioles fine almost as hairs to the partial umbel: the flowers pale yellow and regular: the petals small, long, narrow, acuminate and inflex: the seed short and turgid. It is a native of Sardinia.

The varieties as described by the above writer are: Common Plane-leaved Parsley; Curled Parsley; and Large-rooted or Hamburgh Parsley.

As the Plane-leaved Parsley has much resemblance to the Wild or Fool's Parsley, which is poisonous, the surest way to avoid any hazard is to cultivate the curled, which is said to remain constant, provided care be taken to separate all the plants which have plain leaves, when seed is to be saved from them.

The Large-rooted variety is chiefly cultivated for its roots, which are now pretty commonly sold in the markets: the leaves have much longer foot-stalks, and their subdivisions are not so numerous as in the common sort: the leaflets are much larger, and of a darker green, so that it is easily distinguished from the common kind by its leaves; but the roots are six times as large as those of the Common Parsley can be brought to with the utmost culture.

In the second species the stem is smooth, shining and deeply furrowed: the leaves alternate, radical, pinnated, ternate; pinnae trifid, gash-serrate, shining and smooth: the upper leaves ternate and subsessile: the umbel sub-

sessile or peduncled, with about fifteen unequal rays at each axilla, supported by a trifid leaf: the universal involucre is often wanting: the corollas are small and white: the seeds very small.

Miller cultivated Smallage many years, to try if by art it could be brought to the same goodness as Celery; but all that he could do was to bring it to a larger size, and by earthing to give it a whiteness: it would not grow tall, nor rise with a straight stem, but sent out many suckers near the root, and after it was blanched retained its strong rank taste. But in more southern climates this change has been effected with success.

The varieties according to Martyn are: Sweet or Upright Celery, and Turnip-rooted Celery or Celeriac. The London gardeners cultivate two varieties: the Hollow Celery, which has been long known, and the Solid, which is of later introduction, and is preferred by some for soups and stewing; but supposed by others not so proper for the main winter crop, because it will not endure the frost so well; nor for the market gardener, because it is very brittle, and easily breaks in washing and bunching up.

The Turnip-rooted Celery was formerly supposed to be a degenerate variety from the common sort; but this opinion does not seem well-founded, as from many years trial it has never been found to vary. The leaves of this are short, when compared with those of the other, and spread open horizontally; the roots grow nearly as large as the common Turnip. The difference proceeding from culture has been chiefly in the size of the roots; those properly cultivated on rich ground being much larger than those on poorer land, but the leaves and outward appearance of the plants never alter.

Culture.—In the first or Parsley kinds, the propagation is constantly accomplished by sowing the seeds; the proper season for doing which in the different varieties is any time from the beginning of February till the beginning of May, but they will grow at almost any time of the year; but to have the plants come into use by the time the old Parsley begins to run to seed, it is necessary to make the first sowing about the time just mentioned. The best method for this is in drills, on the sides of the beds; as it is thus not only more conveniently kept clean and more easily gathered, but has a better appearance. Where only required for the use of a family, it may be put in single drills; but for the supply of markets, it is generally sown in large plats, either in broad-cast, raking it in, or in shallow drills, at eight or nine inches distance from each other, trimming the earth evenly over it, to nearly the depth of half an inch, and

then raking the surface, to give it a degree of smoothness. This kind of seed is extremely slow in vegetating, sometimes not appearing in less than a month or five weeks from the period of its being sown. The chief culture the plants require while growing, is to be kept clean from weeds; and when they grow faster than wanted, which is often the case in private gardens, to be cut down close. This should be constantly practised in autumn, as about Michaelmas, or in sufficient time for the plants to recover before the winter sets in.

In the management of this useful plant, great care should be taken, as already observed, always to sow such seed as has been collected from the best curled-leaved plants; and in order to save the seed, some rows of the best one year old plants should be permitted to stand and shoot up their stalks, which is done the May and June following, the seed being ripened in July and August.

In the large-rooted variety the seed should be sown in February or March, in situations where the plants are to remain. For this purpose a spot of light rich earth in an open exposure should be preferred, the seed being sown broad-cast and raked in, the plants generally appearing in about a month after being sown, and in April or May require to be thinned out to the distance of six inches, and cleared of weeds, which may be performed either by the hand or hoe; but the latter is most eligible, as it stirs and loosens the surface of the earth, which is beneficial to the plants. About the latter end of July the roots have mostly attained a proper size for use, and may be drawn occasionally; but they seldom acquire their full growth till Michaelmas. This is sometimes called *Hamburgh Parsley*, probably from its being much cultivated about that place. It is chiefly cultivated and esteemed for its large roots, which are white and carrot-shaped, being long, taper, and of downright growth, often attaining the size and appearance of small or middling parsnips. They boil exceedingly tender, and are very palatable and wholesome, being used in soups or broths, or to eat as carrots and parsnips, or as sauce to flesh meat.

In the cultivated varieties of the second species, the propagation is by sowing the seed in the spring months, as from March till the latter end of April; and when the plants have attained six or eight inches in height, transplanting them into trenches, in the manner described below, in order to be earthed up on each side as they advance in growth, and have their stalks blanched or whitened, to render them crisp and tender. As plants of this kind continue useful only one

year, a fresh supply must be annually raised. The sowing, if a regular succession of plants be required for eight or nine months in the year, should be at two or three different times in the above months. Thus, if it be intended to have Celery for use as early as possible in the summer, as in July, some seed must be sown the first week in March on a warm border, or, to bring the plants more forward, in a slender hot-bed, or if it be necessary to have it still more early, the middle of February; but as the plants of these very early sowings are apt to pipe or run for seed the same year before they attain their perfection, a few only need be raised. But for the principal crops, to come in for autumn or winter, as in August or September, and continue in perfection till Christmas or spring, the seed may be put in about the middle or towards the latter end of March, or in the first or second week in April, in a bed of natural earth in an open exposure; and a little more in the latter end of the latter month, or in the first or second week in May, to furnish a still later crop to come in the beginning of November, and continue good till the March or April following; and to have a late crop principally for the spring, it is necessary that a small portion be sown at the latter end of May; and by putting out some of the plants in shallow trenches in September, October and November, they may be fit for use in March and April, and continue without running till the middle or latter end of the May following. As it has been suggested, that the early crop may either be raised upon a warm border of natural earth, or upon a slight hot-bed, it may be observed, that by the latter practice the plants may be so forwarded, as to be fit to transplant into trenches sooner by three weeks or a month than those raised in the natural ground; a small bed of about eighteen or twenty inches in depth of dung being sufficient, which may be sheltered either by a small frame, or occasionally by mats supported on bent sticks: upon this five or six inches of rich light earth should be laid, the seed being then sown on the surface, and lightly covered in. When the plants appear, the full air must be freely admitted in mild days, but sheltered with glasses or mats in the nights until they acquire some strength, light waterings being occasionally given. When the plants of either of the sowings are two inches high, some of the stoutest should be pricked out into a bed of rich earth, in a sheltered situation, three inches apart; or to bring them still more forward, upon a slender hot-bed, and occasionally sheltered by mats, giving them water, and occasionally shading them till they have struck root; and if rain do not soon

fall, refreshing them as frequently as may be necessary with water.

As the plants thus first pricked out will in May or the beginning of June be generally five or six inches in height, some of the strongest of them should be transplanted into trenches, in order to their being blanched.

In sowing the main and later crops, make choice of a spot of rich light earth, in an open situation, and let it be neatly dug and divided into one or more beds; but one bed is generally sufficient for private use, which should be three feet and a half wide, the surface being made level and smooth. The seed may then either be sown on the surface, and raked in lightly, or the surface first raked fine, and the seed then sown, earth being lightly sifted over it; or the bed, after being first raked smooth, may have the earth shoved with the back of a rake from off the surface into the alley; the seed then sown, and with the rake turned the right way, the earth drawn upon the bed again with a kind of jirk, so that it may spread and cover it equally. When the plants of these sowings are come up, they should be frequently watered in dry weather, especially while they are young; and when about three or four inches high, the seed-bed be thinned by pricking out a quantity of the strongest into an open rich spot, properly dug and divided into beds three feet and a half wide, taking an opportunity, if possible, of moist weather for the business, and in rows six inches asunder, and three or four inches distant in each row, water being given; and, if dry weather succeeds, occasionally repeated till they strike fresh root. In this bed they should remain a month, or five or six weeks, to acquire due strength previous to their being transplanted into the trenches for blanching. The same seed-bed may frequently afford three, four, or more different drawings to prick out in this way, by observing to only prick out the largest plants regularly each time, before they draw each other up weak by close standing: by thus pricking them in beds till the ground intended for the trenches is ready, they will be advancing in their growth, and be considerably better prepared for setting out, than such as have remained constantly in the seed-bed.

The next operation is that of transplanting them into the trenches for the purpose of blanching; the season for which is occasionally from the middle of May till the latter end of October, or even the middle of November, according to the forwardness of the plants, the time they are required for use, and the period it is intended they should continue. When the plants are from six to eight, ten, or twelve inches

in height, they are in a proper state for transplanting into the trenches. It is necessary always to make at least three different transplantings, allowing the distance of three or four weeks, or more, between each; and when the plants are required for use as early in the summer as possible, and to be continued in the spring as late as the middle or latter end of May. It is proper to plant four, five, or even six different crops, allowing the distance of time just mentioned between each separate crop; observing that the crops principally intended for spring use be of the latest sown plants, and not planted in the trenches until September, October, and the beginning of November.

In making the trenches, choose a dry rich spot of ground, in an open quarter, and with a line and spade mark and chop out the trenches crossways of the piece of ground, each trench twelve inches, or about one spade's breadth wide, and allow a space of three feet between trench and trench, that there may be sufficient scope to have a due portion of mould to earth up the plants to a proper height: the trenches being marked in this manner, proceed to dig them out, in order to form the furrow for the reception of the plants, which should be done to the depth of a moderate spade, or about six or eight inches for the early crops; but the later ones do not require so much, without taking out any shovellings; laying the spits of earth alternately to the right and left on the spaces between, levelling them neatly and beating up the edges firm and straight; then let the bottom be properly dug and levelled; or if the ground be poor, first spread in two or three inches depth of rotten dung, and cover it four or five inches deep with earth. The trenches being thus prepared, a quantity of the best plants must be drawn, and after the ends of their roots, and the tops of the straggling leaves have been trimmed off, a row planted exactly along the middle of each trench, placing them four or five inches distant, a good watering being immediately given out of a pot with the rose on, and which, if showers do not fall, should be repeated every other evening, at least till the plants have taken fresh root. Only a few of the very early plants, as those sown in February or early in March, should be planted out at a time, as they are apt to pipe almost as soon as they are blanched, or sometimes before that is fully effected.

When it happens that the plants intended to be planted out in autumn for the late crops have stood so long in the seed or pricking-out beds as to have become rank, and drawn each other up weak, it may be proper to retard

their running up tall, in order to obtain them of robust growth against October and November for planting in shallow trenches: to effect this, it will be advisable, in August or the beginning of September, either to cut them down low to shoot out again, or transplant them into rows nine inches distant.

Another method of planting and making the trenches, but which is less in use, is with a line and spade to cut or mark out a bed, six feet wide, crossways the ground; then to begin at one end, and proceed to dig out a cavity the above width and length, one spade deep, laying the spits of earth to the right and left in a ridge along each side of the cavity or trench, beating it up in front that it may not slip down; and when the trench is thus dug, to loosen and level the bottom; and where dung is necessary, to add it, digging it into the bottom four or five inches deep. When more than one of such trenches are to be made, a clear space of six feet must be allowed between trench and trench, to contain the earth dug out, and to have a sufficiency to bring up to the plants afterwards.

The trenches being thus prepared, the plants are to be trimmed as before directed, and then planted out, observing that they are here to be planted in rows crossways the trench, about a foot asunder, and in other respects as in the former method.

Plants of this sort, in order to whiten or blanch the stalks, and render them crisp, tender, and of a grateful flavour, require to be earthed up as they rise in height on each side; for which purpose the earth that was dug out of the trenches is to be employed; and when that is expended the spaces between them must be dug out, broken and applied repeatedly as the plants advance in growth: in this way blanching them from ten or twelve, to fifteen or eighteen inches or more in height. The proper time to begin this work is when the plants are about ten or twelve inches high, which should be repeated every fortnight or three weeks, according to their growth. In performing the work, regard must be had to break the earth, when lumpy, moderately small with the spade; or the first and second earthings may be performed with a large hoe, but afterwards a spade is to be preferred, and care taken to trim the earth up lightly to the plants, so as not to break the stalks of the leaves, or force the mould into their hearts. The first time they may be earthed three, four, or five inches, according to the size and height of the plants, observing the same rule at each time, till they are by degrees

earthed up to twelve inches, but fifteen or twenty are better. By this means, if the soil be rich, those of the main crop that have been planted out in the end of June or in July, sometimes make such progress, that by September or October they may be blanched eighteen inches or near two feet in length. These earthings are to be continued to the later crops occasionally until Christmas, or as long as the plants continue to grow in height during the winter; at which season, as about November and December, it is proper to earth them up pretty near their tops previously to hard frost setting in, which often destroys such plants as are out of the ground; and which, if of considerable duration, would occasion the decay of most of the other parts that are within the earth. But in the late crops, planted in October or November for spring use, such plants as are of small or low growth will probably require little or no earthing till February or March; at which time they should be earthed up moderately, according to their growth, to have them for April or May, when the general crops are finished. In earthing up the plants that are planted in the latter of the above methods, it will be necessary to trim the earth in well between the rows, taking it equally from the different sides; in doing which it is of advantage, where the plants have attained a large growth, to be furnished with a couple of thin boards six feet long, which are to be used at the time of earthing, to slip into the spaces between the rows of the plants, to keep the stalks and leaves up close just till the earth is put in, placing them close to the plants, and then trimming in the earth between them; and when one space is thus earthed, drawing out the boards, and placing them in the next. The different earthings should always, if possible, be performed when the plants are dry, as where this circumstance is not attended to they are apt to become spotted and cankered. Some of the first earthed up plants, where they have been planted in the trenches in May, or the beginning of June, will generally be fit to take up in July; for when such early plants are blanched five or six inches in length, it is time to begin to take them up, as they rarely continue long before they begin to pipe and become useless. But the plants of the main crop will seldom be blanched any considerable length, till the middle or latter end of August and beginning of September, and will not have acquired their full perfection until October, as observed above. However, where there is much demand for the plants, you may begin to take some up when they are blanched six or seven inches, as, if properly followed with

earthing, they will be daily increasing in length in the blanched part. In winter, at the approach of a very severe frost, it may sometimes be of advantage to cover some of the rows of the main crop with dry long litter to save the plants, and prevent the ground being frozen hard, that the plants may be readily dug up when wanted. And when a hard frost is expected, a quantity of the plants may be taken up for use, and laid in some dry earth in a shed, or other sheltered place.

In the culture of the Turnip-rooted variety, the seed should be sown in an open rich spot in March or April, as directed for the common sort; and when the plants are an inch or two in height, they should be thinned out to three inches; and when at four, five, or six inches in height, transplanted into shallow trenches; previously to which the ground must be dug all over one spade deep, and drills three inches deep, and eighteen asunder, made with a hoe, in which the plants are to be set six inches distant. When they are advanced nine or ten inches in growth, examine the progress of the roots; and if they have acquired a tolerable size, draw earth up to each side of the row of the plants, three or four inches high, which being well watered, will be sufficient to improve the roots. They are generally fit to take up for use in a fortnight or three weeks afterwards.

In saving the seed of Celery, great care should be taken to select the best plants which have not been much blanched, planting them out at the distance of a foot in the early spring months in rich moist soil; and when they have run up to seed, to support them with stakes, till the seed ripens in August, when they should be cut, when dry, and laid to harden in the sun on cloths, after which the seeds should be beaten out and put up in bags for use, being kept dry.

APOCYNUM, a genus containing hardy, herbaceous, perennial and shrubby tender exotics, of the flowering kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order *Contortæ*.

The characters are: that the calyx is a one-leaved, five-parted, acute, short, and permanent perianthium: the corolla is monopetalous, bell-shaped, and semiquinquefid: the divisions revolute: the nectary consists of five glandular oval capsules surrounding the germ: the stamina consist of very short filaments: the antheræ oblong, erect, acute, bifid at the base, converging: the pistillum consisting of two ovate germs: the styles short: the stigmas roundish, bifid at the top, mucicate, glued to the anthers: the pericarpium consists of two long, acuminate, one-



Painted by Syd Edwards

London Published Dec 1865 by G. Kearsey Fleet Street

Engraved by F. Sargent

1 *Apocynum Androsaefolium*
Fly-catching Dogsbane

2 *Antirrhinum purpureum*
Purple Toadflax



Painted by Syd Edwards

London Published Aug 1st 1885 by G. Kearsley Fleet Street

Engraved by F. Sanford

Argemone mexicana
1 Mexican Argemone

Azalea nudiflora coccinea
2 Scarlet Azalea

valved, one-celled follicles : containing many very small seeds, crowned with long down; the receptacle subulate, very long, rough, and free.

The species are : 1. *A. androsæmifolium*, Tutsan-leaved Dogs-bane; 2. *A. cannabinum*, Hemp Dogs-bane; 3. *A. hypericifolium*, St. John's Wort-leaved Dogs-bane; 4. *A. Venetum*, Venetian Spear-leaved Dogs-bane; 5. *A. frutescens*, Shrubby Dogs-bane; 6. *A. reticulatum*, Net-leaved Climbing Dogs-bane.

The first has the stems about three feet in height, and upright. The leaves are opposite; and these and the stems abound with a milky juice, which flows out when they are broken. The corollas are white, with the nectaries of a purplish cast. But, according to some, they are pale red with a tinge of purple, the flowers being pendulous. It is a native of Virginia, and flowers from July to September. It is perennial.

The second species has the roots perennial, and creeping. The stems are brown, and about two feet in height. The leaves are smooth, in pairs, abounding with a milky juice, like the former. Towards the upper part of the stem, the flowers come out from the wings of the leaves, in small bunches, and are of an herbaceous white colour, and small. It is admitted for the sake of variety. It flowers as above; and is a native of the same place. The stems afford a hempy substance.

In the third the root is likewise perennial, and creeping. The stems annual, upright, round, branched, a foot and a half in height, and filled with a white pith. The leaves opposite, sharpish, quite entire, subsessile; the upper ones on the extreme twigs petioled, not revolute. The peduncles umbelled, and terminating. The flowers small, and inodorous. The leaflets of the calyx are oblong, concave, erect, and green. The corolla white, and longer than the calyx. Between the filaments there is a roundish, green gland. The whole plant is smooth, and abounds with a milky juice. It is a native of North America, and flowers in June and July.

The fourth species has the root perennial, and creeping. The stems about two feet high. The leaves opposite and smooth. The flowers grow erect, at the top of the stems in small umbels, and are much larger than in the former sorts. It is a native of the islands in the Adriatic sea, and flowers in July and August.

There are varieties with purple, and with white flowers.

In the fifth the stem is woody, five or six feet in height, dividing into several branches. Leaves opposite, petioled, smooth, quite entire. The

peduncles from the axils, opposite; being oppositely branched. The corolla salver-shaped. The flowers are in loose bunches, small, and of a purple colour; but never succeeded by pods in this country. It is a native of the East Indies, &c.

The sixth species has a twining stem, by which it rises to a considerable height. The leaves are dark green, very shining, with a beautiful net of milky veins. It is a native of the East Indies, &c.

Culture.—The four first species are capable of being easily propagated, by dividing their creeping roots either in the early spring months, before they protrude their stems, or in the autumn. The soil most proper for them is that of the light dry kind, as, where there is much moisture, they are apt to be destroyed in the winter season by their roots becoming rotten. In the second species the roots sometimes spread in a troublesome manner.

The fourth species requires a very dry, warm exposure; as it is less hardy than the former. It is best to remove it when necessary in the early spring, when it is about to send forth its stems.

The two last species are best propagated by layers or cuttings from their young shoots, which should be made during the summer season, being dried in the stove some days before they are planted out. They are likewise capable of being raised by seed, when it can be procured, as they seldom afford any in this climate. In either method, pots of light sandy earth should be employed. In the former, the layers or cuttings, after being planted out in them, should be placed in a mild hot-bed; and in the latter, after the seeds are sown, the pots should be plunged into a tan-bed. When the plants are up they must be watered sparingly, and kept constantly in the tan, being changed into larger pots as they advance in growth, great care being taken not to over-pot them, as they thrive best where their roots are a little confined. Under good management, they mostly flower in the second year.

The first kinds are sufficiently hardy to bear the exposure of the open air; but the latter sorts require the constant protection of the stove. The former are well adapted for producing variety in the clumps and borders of walks in pleasure-grounds; and the latter for ornament in the stove, where, from their beautiful ever-green leaves, they have a fine appearance.

APPLE-TREE. See *Pyrus Malus*.

APRICOT. See *PRUNUS*.

AQUILEGIA, a genus containing plants of the hardy herbaceous perennial flowering tribe, and Columbine kind.

It belongs to the class and order *Polyandria*

R

Pentagynia, and ranks in the natural order of *Multisiliquæ*.

The characters of which are: that there is no calyx: the corolla consists of five lanceolate-ovate, flat, equal-spreading petals: the nectaries five, equal, alternate with the petals; each horned, and gradually broader upwards, with an oblique mouth ascending outwardly, and annexed inwardly to the receptacle, produced below into a long attenuated tube with an obtuse top. The stamina consist of numerous filaments, subulate; the outer ones shorter, and oblong erect anthers the height of the nectaries: the pistillum consists of five ovate, oblong germs; ending in subulate styles longer than the stamina, and erect simple stigmas; the chaffs ten, wrinkled, short, separate, and involving the germs: the pericarpium consists of five erect, distinct, cylindrical capsules, gaping from top inward, containing numerous ovate, shining seeds, annexed to the gaping suture.

The species are: 1. *A. vulgaris*, Common Columbine; 2. *A. Alpina*, Mountain Columbine; 3. *A. Canadensis*, Canadian Dwarf Columbine.

In the first the stem is three feet high, erect, branching, leafy, and somewhat angular. The leaves smooth, glaucous underneath; the lower ones petiolate, biternate; the leaflets roundish, trilobate, gashed and notched; the upper ones digitate, the lobes oval and quite entire: the radical petioles very long. The flowers are produced from the tops of the naked branches, and hang down; they have generally six pistils and eight nectaries. It is a native of most parts of Europe, and perennial, flowering in June.

There are several varieties, the flowers varying greatly by culture, becoming double either by multiplying the petals or the nectaries. And of all these varieties, there are subordinate variations, both in the degree of doubleness, as with two or more rows of petals, two or three rows of nectaries, curiously inserted one into the other; and in the colours, as blue, white, red, purple, flesh-coloured, ash-coloured, chestnut-coloured, and striped or variegated blue and purple, blue and white, red and white, &c.

The second species has the root biennial. The leaves biternate, tender, and smaller than in the common sort; the leaflets multifid; the lobes sublinear and blunt; with the appearance and tenderness of the Canadian Columbine. It is a native of the Alps, &c. and flowers in May and June.

The third has likewise a perennial root. The stems are very slender, and reddish. The leaves in the lower ones biternate, irregularly divided,

the extreme lobes blunt; the upper ones simply ternate, toothed or quite entire; the uppermost simple, lanceolate, and acuminate. The corollas yellow within, and red on the outside. It is a native of Virginia, &c. and flowers in April.

Culture.—The culture in these plants may be effected, either by sowing the seeds, or parting the old roots; but the first is the best practice, as the old roots are apt to decline and degenerate after they have blown a few seasons. The seed may be put in either in the autumn or spring season; but the former is the better, as seed which has remained long out of the ground seldom grows well. A bed of fresh light earth is the best for the purpose. In the following spring the plants should be kept clear from weeds, and occasionally watered when the season is dry; being transplanted into other beds of the same sort, during the summer or autumn, according to their growth, at the distance of eight or ten inches every way; water being given when necessary. The plants mostly blow in the following summer, but seldom in a strong manner. The best flowering roots should therefore be taken up in the autumn, and planted out in such situations in the garden and pleasure-grounds as they are designed to remain in. In order to prevent the roots from degenerating by the reception of the farina of other flowers, the flower-stems should be cut down immediately after they have blown. And to keep up a proper succession of fine flowers, some plants should be raised every two years from seed.

In saving the seed of the variegated kinds, great care should be taken that no plain flowers be left among them.

The different varieties of these plants are capable of being increased by parting the roots of the young plants, such as those of three years old, in the autumn or spring.

The only general culture these plants require, is that of keeping them free from weeds, and cutting the decayed stems down in the autumnal season.

The last species often flowers sooner by a month than those of the other kinds.

All the varieties of the first, however much they may seem to differ in form, colour, size, structure, and variegation, are capable of being produced from seed of the same plant.

They are all adapted to afford variety in pleasure grounds and gardens; and the Canada sort is esteemed for the early appearance of its flowers.

ARABIS, a genus comprising plants of the hardy perennial and other kinds.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliculosæ*.

The characters are, that the calyx is a four-leaved deciduous perianthium; the leaflets from parallel converging; the two opposite larger, ovate, oblong, acute, a little prominent at the base, gibbose, concave; the two others linear, erect. The corolla four-petalled and cruciform. The petals spreading, and ending in claws the length of the calyx: the nectaries four, each from a little scale within the bottom of the calycine leaflet, affixed to the receptacle, reflex and permanent. The stamina consist of subulate upright filaments; two the length of the calyx, four twice as long; the antheræ cordate and erect. The pistillum a columnar germ, the length of the stamina: no style; the stigma obtuse, and entire. The pericarpium is a compressed, very long, linear, unequal *siliqua*, with swellings at the seeds; valves almost the length of the partition; the seeds numerous, roundish, and compressed.

The species principally cultivated is the *A. Alpina*, Alpine Wall-cross.

It is a perennial plant, increasing very fast by its creeping roots, which run obliquely near the surface, and send out fibres at every joint. The root-leaves are collected into heads, spreading circularly: they are oblong, whitish, and indented on their edges. From the middle of these heads arise the flowering stems, which grow near a foot high; with leaves on them placed alternately, broader at their base than those which grow below, and closely embracing the stem. The flowers grow in loose bunches towards the top: the petals are white, obtuse and entire: the calyx is yellowish, shorter by one third than the corolla. It is a native of the Alps, and flowers in April.

Culture.—The propagation of this plant is readily effected by the seeds, or the parting of its creeping roots. In the first method the seed may either be sown in the autumn, or left to be scattered by the plants. But in the latter, which is the most common method, the roots are parted and planted out in the autumn, in places where they are to remain.

It succeeds in almost any situation, and is extremely hardy, of course adapted to cold exposed situations, where the finer sorts of flowering plants do not succeed. It affords a pleasing variety when planted among shrubs, in clumps, or borders; it is esteemed for its very early flowering, and the pretty appearance it makes in cold exposed situations, where few others thrive.

ARALIA, a genus comprehending plants of

the herbaceous and woody kinds. The Berry-bearing Angelica, and Angelica Tree.

It belongs to the class and order of *Pentandria Pentagynia*, and ranks in the natural order of *Hederaceæ*.

The characters are: that the calyx is a very small involucre, of a globular umbellule: the perianthium five-toothed, very small, and superior: the corolla consists of five ovate, acute, sessile and reflex petals: the stamina have five subulate filaments the length of the corolla: the antheræ are roundish: the pistillum is a roundish germ, inferior: the styles very short but permanent, and the stigmas simple: the pericarpium, a roundish, striated, crowned, five-celled berry: the seeds hard, oblong and solitary.

The species are: 1. *A. spinosa*, Thorny Aralia, or Angelica Tree; 2. *A. racemosa*, Berry-bearing Aralia; 3. *A. nudicaulis*, Naked-stalked Aralia.

The first rises with a woody stem to the height of eight or ten feet, dividing into several branches, with branching leaves, composed of many divaricated wings, with oblong leaflets: the ribs of the leaves, as also the branches and stem, are armed with strong crooked spines, rendering the places where the plants grow in plenty very difficult to pass through. The flowers are produced in large loose umbels, at the extremities of the branches, and are of an herbaceous colour. The berry is three-cornered and three-celled. It is a native of Virginia.

The second species grows three or four feet in height, and divides into many irregular branches. The leaves are ramose and alternate: the peduncles axillary, terminated by round umbels of small four-leaved flowers, of a whitish colour; succeeded by round channelled berries, which when ripe are black. It flowers in July, and the seeds ripen in October, and is a native of Canada.

In the third species the stem is so very short as scarcely to be called any: the leaves are decomposed, with long petioles: the leaflets pinnate with five serrate pinnae. A scape arises between two leaves, which is trifid, or bears three umbellules. It rises nearly to the same height as the former. The flower-stalks spring immediately from the root, and are terminated by round umbels of flowers, in shape and colour like the foregoing; but the berries are smaller. It flowers towards the end of July, and the seeds ripen late in the autumn. It is a native of Virginia.

Culture.—The propagation in these plants may be accomplished either by sowing the seeds or dividing the roots. In the first method, with the first species, the seeds should be sown

in the spring, as soon as procured from America, in pots of light earth, being thinly covered with mould, and then brought forward by having them placed in a very gentle hot-bed. If the plants do not appear in the first spring after being sown in this way, they should be kept clear from weeds till the following autumn, and then plunged into an old tan-bed, being protected in the winter; and in the very early part of the succeeding spring removed into a gentle hot-bed, to get them forward and of vigorous growth. Where bark-beds are not at hand, the pots may be placed out on warm sheltered borders, being carefully protected during the winter by a garden frame or other means; but the hot-bed is the best mode. In either method, as soon as the plants are up they should have water given them occasionally, and be well shaded from the sun in the summer months; fresh air being admitted pretty freely to them in mild weather, in order to prevent their growing up weakly.

The plants should not be disturbed the first season; but as in their early growth they are often injured by frost, in October the pots should be placed under a frame, where they may be well screened, but constantly opened to enjoy the free air in fine weather. In the following spring, before they begin to push, they should be carefully shaken out of the pots, and separated; part of them being planted singly into small pots, and the other in a bed of light earth in a warm situation. When those planted in small pots are plunged in a moderate hot-bed, it greatly forwards their growth; but they should be inured to the open air as much as possible. In the following summer they should have a shady situation, and the next winter be sheltered again; and the spring following they may be shaken out of the pots, and planted where they are to remain. The plants which were planted in the bed will require protection from frost the first winter; but if the surface of the ground be covered with old tan, it will prevent it from penetrating to their roots; and if in hard frosts some straw, peas-haulm, or any light covering be laid over the bed, it will secure their stems from being injured. The plants in these beds should remain two years, by which time they will be sufficiently strong to transplant into the places where they are to grow. These plants, from their not coming out early in the spring, often continue growing late in the autumn, which causes the extreme parts of their shoots to be tender, by which they often suffer from the early frosts in autumn, which frequently kill the upper parts of the shoots; but as their woody stems are seldom injured, they put out new branches below; and if in very severe win-

ters the stems are destroyed, the roots remain, and put out new ones in the following summer.

In the raising of these plants by the roots, some of the strongest should be separated from the old plant, and left in the ground to send up new shoots; or pieces may be cut off and planted in pots, and then plunged in a moderate hot-bed, by which they readily send up shoots and form plants.

In the second and third sorts the seeds should always be sown in the autumn as soon as they become ripe, as there is much loss of time by sowing them in the spring, from their seldom coming up the same year. In the following autumn, when their leaves decay, the plants may be taken up by the roots, and planted out where they are to remain.

They are likewise capable of being raised by dividing the roots, which should be performed at the same period as the above, the plants being set out at considerable distances.

The general management in all the sorts is only that of keeping them perfectly clean and free from weeds.

The first is a plant of the most ornamental kind, which should have a place in the large borders and clumps of gardens and pleasure-grounds, where they are the most exposed to view. It is deciduous in leaf.

The two last are plants of the herbaceous kind, and from their hardy nature well suited for affording variety in shaded wilderness situations.

ARBOR, a plant of the perennial kind, that rises with a lasting simple ligneous stem or trunk to a considerable height and thickness. It is used to signify a tree in opposition to a shrub. See *Tree* and *Shrub*.

ARBOUR, a small ornamental shady retreat, formed in gardens and pleasure-grounds, with various sorts of trees and shrubs, placed in such a manner as to inclose a certain space, and make a kind of seat or recess for the hot summer season. Places of this kind were formerly much more fashionable and in higher estimation than at present. They are commonly formed of evergreens, as yew, privet, &c. planted very close, having the sides trained erect, six, eight, or ten feet in height, and the tops formed in various shapes over frames or lattice-works of wood or iron for the purpose, having openings of different kinds formed on the sides, the whole being cut or clipped over annually to keep them in proper order, which in many cases and situations have a good effect. They may also be formed of deciduous trees, particularly the elm, and sometimes with the hornbeam, beech, and



Painted by Edw. Smith

London Published Jan 1860 by G. Knapp, Fleet Street

Engraved by Edw. Smith

1 *Arbutus unedo*
Strawberry Tree

2 *Alyssum saxatile*
Yellow Alyssum

time, which must be constantly cut over every summer. The forms of the evergreen as well as deciduous kinds are mostly either square, hexagonal, octagonal or round, and their dimensions generally from ten to fifteen feet in width and height; the tops being mostly either pavilion-, turret-, or dome-shaped, and sometimes terminated by a globe, pyramid, or other figure, formed of the extreme branches. Covered arbours or bowers may be formed very quickly, even in one season, by several sorts of shrubby herbaceous climbing plants; some of which are capable of advancing fifteen or twenty feet in one season. They should, if possible, be erected upon a somewhat rising ground, for the greater advantage of free air and prospect. They are also capable of being formed in the heads of large single trees, particularly elms, where the trunks have divided at the height of ten or twelve feet, into several lesser spreading stems, so as to admit of constructing a small platform between them, cutting down the large boughs, and training the pliable branches archways over lattice-work till those on each side meet; then clipping the sides annually: the tops in this case may either be cut, or permitted to grow up, or the whole suffered to advance in a natural growth. They may likewise be made on the ground in another manner; as by planting some of the tallest-growing flowering shrubs round the inside to form the dimensions, then on the outside of these others of somewhat lesser growth; continuing them in this way for three or four ranges, diminishing gradually in stature from the arbour outwardly, and permitting the whole to take their natural growth; so that at a distance they may assume the appearance of common shrubby clumps. Their bottoms, when on the ground, should be well gravelled, and neat garden-stools or chairs placed in them during the summer season.

ARBUTUS, a genus containing plants of the evergreen, shrubby and ornamental kind. The Strawberry Tree.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a five-parted, obtuse, very small permanent perianthium; the corolla is monopetalous, ovate, and flattish at the base, diaphanous, with a quinquefid mouth: the divisions obtuse, revolute and small: the stamina consist of ten subulate swelling filaments, very slender at the base, affixed to the edge of the base of the corolla, and half the length of it: the antheræ slightly bifid and nodding: the pistillum is a subglobular germ, on a receptacle marked with ten dots: the style cy-

lindric, the length of the corolla: the stigma thickish and obtuse: the pericarpium a roundish five-celled berry: the seeds small and bony.

The species of most importance are: 1. *A. Unedo*, Common Arbutus, or Strawberry Tree; 2. *A. Andrachne*, Oriental Strawberry Tree; 3. *A. Uva Ursi*, Trailing Arbutus, or Bearberry.

The first species, Common Arbutus or Strawberry Tree, rises to the height of twenty or thirty feet in its native situation, but rarely with an upright stem. But with us it is of much humbler growth. It usually puts out branches very near the ground. The leaves keep on all the winter, and are thrust off in the spring by new ones, so that it is always clothed with leaves. The berries have many seeds in them, and are roughened with the tubercles of the seeds.

There are several varieties; as with large oval fruit, with round fruit, with double flowers, with scarlet flowers; there are also the curled-leaved or cut-leaved, the broad-leaved, and the narrow-leaved.

The second species much resembles the first, but the bark is not rough; some of the leaves have no serratures, and the panicle is upright and viscid, which in that is smooth. It grows in its native state to a middle-sized tree, with irregular branches. The leaves are smooth, large, and somewhat like those of the Bay Tree, but not quite so long: the flowers are like those of the Common Arbutus, but growing thinly on the branches: the fruit oval, of the same colour and consistence with the common sort; but the seeds of this are flat, while in that they are pointed and angular. It grows naturally in the East.

In the third species the branches trail upon the ground two or three feet round the root or more. The leaves are alternate, bluntly oval or oblong wedge-shaped, with a net-work of veins underneath, and corresponding wrinkles above, firm and evergreen like those of Box: the flowers grow at the extremities of the branches in small clusters, each supported by a short red foot-stalk: they are of an oval-conical figure, flesh-coloured, or white with a red mouth, and divided into five obtuse, reflex segments at the rim: the berries are round with a depressed umbilicus, smooth and glossy, red when ripe, and of the size of a holly-berry, replete with an austere mealy pulp, in which are five cells containing five angular seeds. It is a shrub very abundant in many parts of the continent, as Sweden, &c.

Culture.—The most usual method of raising these beautiful evergreens is by sowing the seeds; but they are sometimes capable of being raised by cuttings and layers.

In the first of these methods with the first species, the seeds should be collected when perfectly ripe in November, or the following month, and preserved in dry sand till the period of sowing, which may either be in December or the early spring season. The seed should be sown in pots, and lightly covered with mould, then plunged into an old tan hot-bed, and covered by glasses. In this mode the plants will be up in April, when they should be often but sparingly watered, and kept free from weeds.

As the hot season proceeds, the plants should be shaded during the heat of the days; but in warm weather open all night to receive the dew, and only covered in the middle of the day. In this mode the plants become strong the first summer. In the beginning of October they may be shaken out of the pots, and their roots carefully separated, planting them singly in small pots filled with light earth; then plunging the pots into an old bark-bed under a common frame, carefully shading them from the sun in the middle of the day, and giving them water as they require; in this bed the pots should remain during the winter, exposing them to the open air whenever the weather is favourable; but in frosty weather they should be covered, so as to protect them. In the spring following they may be removed to a gentle hot-bed, which requires no other covering but mats. This enables them to make strong shoots early in the summer, by which they become in a better condition to bear the cold of the succeeding winter. In this bed they should continue during the summer, and be well protected in the following winter.

After the plants are become two or three feet in height, shake them out of the pots, and plant them in the open ground in the places where they are to remain, which should be done in April, that they may have taken good root before the winter, which is apt to injure them when newly planted out; and as all the earth about their roots is thus preserved, they will succeed better.

The plants are tolerably hardy, and seldom hurt, except in extreme hard winters, which often destroy the young tender branches, but rarely the roots.

They delight in a generous but not too moist soil, as when planted in dry ground they seldom produce much fruit: the flowers coming forth in autumn, when the winter proves severe, they are generally destroyed; consequently, to obtain fruit, they should be placed in warm situations, and where the ground is not naturally moist; a good quantity of loam and rotten neat's dung should be laid about their roots, and in dry springs they should be plentifully watered.

The most proper season for transplanting is

September, at which time the blossoms are beginning to appear; and when dry at that season, and they are kept moist, they very soon take root; but towards November their roots should be well covered to keep out the frost. In performing this business the balls of earth round their roots should be preserved.

In raising the second species the seeds must be procured from abroad, and the plants be left longer in the pots, as three or four years, or until they are become perfectly woody; and when put out, warm situations be chosen for the purpose, where the soil is dry, as the plants do not succeed well where the land is too moist.

The third species should be raised in pots filled with bog earth, which should be set out in moist watery situations.

In propagating them by the second method, or that of cuttings, they should be made from the young shoots, and be planted in pots in the spring or summer months, plunging them into a good hot-bed of tan or dung till they have stricken root.

In the layer mode of propagation the young shoots should be chosen, as they otherwise seldom take root in less than two years.

In grafting them, stocks of any of the varieties may be had recourse to.

In continuing the double-blossomed and scarlet varieties, some of these last methods must always be employed.

These are some of the most ornamental plants of the evergreen kind for shrubberies and pleasure-grounds that we possess. The first sort and varieties sometimes rise to a considerable height, as ten or fifteen feet. They are now found in most plantations, and in the months of October and November, which is the season when they are in flower, and the fruit of the former year is ripe, as it is a whole year in growing to perfection; they are very ornamental. When there is plenty both of fruit and flowers upon the trees, they indeed make a handsome appearance, as most other plants are past their beauty. The trees which have large oval fruit make the greatest figure; the flowers of this being larger and oblong. The variety with double flowers is a curiosity: but the flowers, having only two rows of petals, make no great appearance, nor do the trees produce fruit in any quantity; the other is therefore preferable. That with red flowers makes a pretty variety, when intermixed with the other, for the outsides of shrubberies, as they are of a fine red colour at their first appearance, and afterwards change to purple before they fall off. The fruit in this is the same as in the common sort.

As the leaves of the *Andrachne* are larger

than in the other sorts, they have always a better effect as evergreens.

ARCTOTIS, a genus comprising herbaceous plants and shrubby perennials of the exotic kind for the green-house.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Corymbiferae*.

The characters are: that the calyx is common, roundish, imbricate; lower scales more lax, subulate; middle-ovate; innermost oblong, scarious, rounded, and concave at the end: the corolla compound, radiate; corollules hermaphrodite; very many in the disk; females ligulate, near twenty, longer than the diameter of the disk proper, of the hermaphrodites funnel-shaped; border quinquefid; ends reflex, equal; of the females ligulate, lanceolate, very finely three-toothed; tube very short: the stamina of the hermaphrodites consist of five capillary filaments, very short: the anthera cylindrical, tubular, five-toothed, the length of the corolla: the pistillum of the hermaphrodites is a germ scarcely visible: the style cylindric, a little longer than the corolla; the stigma simple; of the females the germ ovate, four-cornered, villose, crowned with its proper calycle: the style filiform: the stigmas ovate, oblong, thickish, erect; no pericarpium: the calyx unchanged; no seeds in the hermaphrodites; in the females solitary, roundish, villose, crowned with a calycle, usually of five leaves: leaflets ovate, spreading: the receptacle villose, or chaffy and flattish.

The species of most importance are: 1. *A. calendulacea*, Marigold-flowered Arctotis; 2. *A. dentata*, Five-leaved Arctotis; 3. *A. acaulis*, Dwarf Arctotis; 4. *A. tenuifolia*, Small-leaved Arctotis; 5. *A. grandiflora*, Great-flowered Arctotis; 6. *A. plantaginea*, Plantain-leaved Arctotis; 7. *A. angustifolia*, Narrow-leaved Arctotis; 8. *A. aspera*, Rough-leaved Arctotis; 9. *A. paradoxa*, Chamomile-leaved Arctotis.

The first has the peduncles villose, beset with red bristles, before and after flowering time nodding: the ray yellow, purplish underneath, twisted during the night: the corollules of the disk black on the outside, and with black antheræ: the outer scales of the calyx spreading, subulate, very short, hispid. It is annual.

There are several varieties of this species.

The second species has the stem branching: the leaves alternate, somewhat rigid and villose: the pinnae recurved: the peduncles long, one-flowered: the flowers small, with the ray purple beneath. It is annual, and flowers in July.

The third is a low plant, the flower-stem rarely exceeding six inches in height; but the

flowers, which are yellow, are large and fine: they come out in April, and continue to July.

The fourth species has the stems herbaceous and few, not much branched: the leaves filiform or linear, rather fleshy and naked: the peduncles very long, solitary, naked and filiform: the bractea minute and filiform: the calyx imbricate, scarious above: the ray yellow. It is perennial.

The fifth has the ray very large: the petals are straw-coloured, with a tinge of red underneath, yellowish above near the base, with a very dark purple mouth. It is biennial, and flowers from March to May.

The sixth species has the leaves tomentose underneath: the disk barren. It is perennial, and flowers from June to August.

The seventh has the florets of the disk barren, and the receptacle very woolly.

There are varieties of it with leaves scarcely broader than those of Lavender.

The eighth has the stem stiff, perennial and villose, with purple streaks: the leaves white underneath: the corollas of the ray yellow, with red streaks beneath and fertile: those of the disk barren.

There is a variety of this with handsome orange-coloured flowers, displaying themselves from July to September.

In the ninth species the chaffs are elongate, coloured, almost the length of the ray; whence the flower has the appearance of a double one.

Culture.—All the annual sorts are capable of being raised by sowing the seeds in the spring in pots of light fresh earth, plunging them into a very moderate hot-bed. The plants, when well rooted, should be gradually inured to the free air. When the season is dry, water will be frequently necessary. They likewise require to be frequently removed into other pots. As they never grow healthy if kept too much in the house, when the weather is suitable they should always be exposed to the open air. They may also be propagated by slips from the roots.

The shrubby sorts are propagated by cuttings from the young shoots, which should be planted in pots or beds of light fresh mould in the summer months, being occasionally watered and shaded until they become perfectly rooted, which is generally in six or eight weeks; when they must be carefully removed into other separate pots, and preserved in the open air as long as the weather permits, being shaded from the sun, and watered when necessary. During the winter the protection of a very dry green-house will be requisite for all the sorts; but these should be placed as much exposed to the mild air as pos-

sible, without being shaded by other plants; which induces mouldiness. These, like the annual sorts, require to be removed two or three times in the summer into other pots, to prevent their shooting their roots through the holes, and being injured when taken up.

From their being easily destroyed in the winter, it is necessary to raise supplies annually from cuttings in the summer season.

And as many of the plants rise to the height of three or four feet or more, and send forth many branches, they require occasional pruning.

As they flower both in the summer and winter seasons, they are curious, and afford a pleasing variety in the green-house or stove.

ARDUINA, a genus comprising a plant of the evergreen shrubby kind for the green-house. The Cape Buckthorn.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters of which are: that the calyx is a five parted, erect, acute, small, permanent perianthium: the corolla one-petalled, funnel-shaped: the tube cylindrical, a little curved inwards at top: the border five-parted, acute and spreading: the stamina consist of five simple filaments, shorter than the tube, and inserted into the lower part of it: the antheræ are oblong, within the throat of the corolla: the pistillum is a germ superior and ovate: the style filiform, the length of the tube, and the stigma bifid, thickish: the pericarpium is a globular-oval, two-celled berry: the seeds solitary, oblong and hard.

There is only one species, *A. bispinosa*, Two-spined Arduina.

It is a low shrubby plant, seldom rising above four or five feet in height. It sends out spreading branches in pairs from top to bottom, and they are covered with a dark-green bark, and armed with short strong thorns, which come out by pairs; and sometimes there are double pairs upon the same foot-stalks, which are situated just below the leaves; and where there are four, two point upwards, and the other two downwards. The leaves are heart-shaped, not much larger than those of the Box Tree, or about an inch long, and three-quarters of an inch broad at their base, of the same consistence and colour, terminating in acute points; they are placed opposite in pairs pretty close together, and continue green all the year. The flowers come out in clusters at the ends of the branches, upon short slender peduncles, each supporting five or six small white flowers, having an agreeable odour. They commonly appear in July and August, and are seldom succeeded by

seeds in this climate. The berries do not ripen till the following spring, and are then of a deep-red colour. It is a native of the Cape of Good Hope.

Culture.—This plant is capable of being increased by cuttings and layers of the young shoots, the former planted out in the summer season in pots, plunged in moderate hot-beds, and shaded from the sun. After they have taken root, they should be removed into small pots, and placed in the shade till they have taken fresh root: they may then be removed to a sheltered situation till autumn, when they must be put into a green-house, or under a hot-bed frame, as they are too tender to live in the open air.

This is an elegant plant; but requires to be constantly kept in pots, in order to be removed into the shelter of the green-house during severe weather.

ARECA, a genus comprising a tree of the exotic Palm kind. The Fausel-nut Palm, or Cabbage Tree.

It belongs to the class and order *Monocia Enneandria*, and ranks in the natural order of *Palmæ*.

The characters are: that in the male flowers the calyx is a bivalve spathe, having the spadix branched: proper perianthium three-leaved: the corolla consists of three acuminate, rigid petals: the stamina consist of nine filaments, the three outer longer than the rest: female flowers in the same spadix: the calyx is a common spathe with the males: proper perianthium three-leaved: the corolla three acuminate rigid petals: the pericarpium a subovate, fibrose berry, surrounded at the base with the imbricate calyx: the seed is ovate.

The species is *A. oleracea*, or Cabbage Tree.

In this the sheaths of the leaves are very close, and form the green top of the trunk, a foot and half in length. Below this come out green shining spathes, which fall to the ground when the very branching spadix bursts forth. The calyx of the flower is one-leaved, cut half way into three segments. The fruits are oblong, obtuse berries, slightly bent, of a blue purple colour, succulent, scarcely fibrose, the size of a middling olive: the pulp dries away, and becomes a brittle, wrinkled bark. The nut or stone is oblong, smoothish, rather acute at the base, membranaceous, brittle, thin, whitish-brown frequently with a shade of red. The kernel is oblong, cartilaginous, very hard, and has a cavity in the middle of a small fissure. In its native state the inhabitants cut off the green top of the trunk, take out the white heart, and make use of it as an article of food. But in

this climate, it is chiefly kept in the stoves for variety.

Culture.—The propagation in this tree is effected by sowing the seeds in pots of light good earth as soon as procured from abroad, plunging them in moderate hot-beds of dung or bark in the stove, moderate waterings being given. After the plants are risen a few inches, they should be removed into separate small pots, and replaced in the hot-beds, watering them as necessary. As they advance in growth, they must be removed into larger pots.

It is a plant that deserves a place in the stove, for its singularity and the beauty of its foliage.

ARGEMONE, a genus comprehending a plant of the annual kind: The Prickly Poppy.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rhacadeæ*.

The characters of which are: that the calyx is a three-leaved, roundish perianth: the leaflets roundish with a point, concave and caducous: the corolla consists of six roundish petals, from erect spreading, larger than the calyx: the stamina consist of numerous filiform filaments, the length of the calyx: the anthers are oblong and erect: the pistillum is an ovate, five-angled germ: there is no style: the stigma thickish, obtuse, reflex, quinquelid and permanent: the pericarpium is an ovate, five-angled, one-celled, half-valved capsule: the seeds numerous and very small: the receptacles linear, fastened to the angles of the pericarpium, but not gaping: the half-valved capsule distinguishes this from the *Papaver*.

There is only one species cultivated in the garden: *A. Mexicana*.

It is an annual plant, rising to the height of two or three feet, with stems armed with prickles: leaves sinuate or jagged, soft, shining, stem-clasping, the points of the jags ending in sharp yellow spines; on the upper side there are milky veins, as in Our Lady's Thistle; on the under, small prickles along the midrib and veins: the flowers are solitary at the ends of the stem and branches: the corolla is yellow, with from four to six petals: the calyx consists of two or three prickly leaves; the stigma is capitate, small, with five notches: the capsule superior, having five or six ribs from top to bottom, and between the ribs armed with bristle-shaped spines; at the top is the flattened stigma: the seeds are very numerous, round, black, rough, with a compressed scar on one side: the valves of the capsule vary in number, as well as the petals, from four to six. It is a native of Mexico, and flowers in July and August.

Culture.—As this is an annual plant, it may be easily raised by sowing the seeds thinly in spots of light earth in the places where the plants are to remain. As the plants shed their seeds, they mostly continue for several years after they have been once introduced.

ARISTOLOCHIA, a genus comprehending various plants of the herbaceous and exotic kinds.

It belongs to the class and order *Gynandria Hexandria*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that it has no calyx: the corolla is monopetalous, tubulous, irregular: the base swelling, subglobular, torulose: the tube oblong, hexagon-cylindric: limb dilated, and extended below into a long tongue: the stamina have no filaments: the antheræ six, fastened at bottom to the stamens, and four-celled: the pistillum is an oblong, inferior, angular germ: style scarcely any: the stigma subglobular, six-parted, and concave: the pericarpium is a large, six-angled, six-celled capsule: the seeds several, depressed and incumbent: the fruit varies in figure, being in some species roundish, in others long.

The species are numerous; but those employed for ornament in gardens are chiefly: 1. *A. erecta*, Upright Birthwort; 2. *A. Siphon*, Broad-leaved Birthwort; 3. *A. arborescens*, Tree Birthwort; 4. *A. sempervirens*, Evergreen Birthwort; 5. *A. pistolochia*, Ramose-stalked Birthwort.

The first rises with an upright stalk to the height of three feet: the leaves are long, narrow, hairy, growing close to the branches, having scarce any foot-stalks: the flowers come out singly from the axils, are near four inches long, of a dark purple colour, and grow erect; these are succeeded by slender vessels, about one inch long, filled with flat heart-shaped seeds. It is a native of Vera Cruz in New Spain.

The second species is a tall twining shrub: the root woody, sparingly branched, fragrant, having the smell of camphor: the stems are wrinkled, gray and fragrant: the branches and twigs alternate, sarmentose, obscurely flexuose, round, even, green, becoming gray: the leaves spreading, remote, roundish, sinuate-cordate, acuminate or scarcely acute, entire, villose and paler beneath, veined: the nerves prominent on the lower surface, flat, in length, and in breadth six inches: the petioles shorter than the leaves, semicylindric, grooved above, somewhat villose: peduncles lateral, at the joints below the leaf, pendulous, longer than the petiole, one or two together, one-flowered: the bracte embracing the middle of the peduncle, decurrent a little,

leafy, roundish, cordate, villose beneath, spreading, caducous: the corolla purplish-brown, one inch and a half long, ten or twelve lines broad: tube-shaped like a siphon, marked with lines, bellying at the base, in the middle broader and flatted a little, at the end narrow and cylindrical: border marked with brown lines, spreading, inclined, waved, trifid, the clefts rounded and slightly acuminate: there are no filaments: antheræ six, fastened to the stigma by pairs beneath, ovate, two-celled and yellow: the germ is a hexangular column, finely villose: stigma at the bottom of the corolla, very large, roundish, three-valved, furnished with three points: capsule cylindrical, with a blunt point, six-nerved, six-valved, splitting into six parts from the very peduncle: the cells covered with a transparent membrane forming a sort of common aril for the seeds. It is three or four inches long, and one inch broad: the seeds numerous, obovate, flat, rufous, incumbent; fastened to each other by pairs, only one of which is fixed to the partition. It is distinguished by the form of its flower, which is bent like a siphon; by the trifid, flat border; by the very large bracte placed on the middle of the peduncle; by the disposition of the seeds, and the aril being common to all the seeds of each cell. It is a native of North America, and flowers in June and July.

The third species rises about two feet in height: the branches are not very woody, but are strong enough to support themselves: the flowers come out singly at the axils: the branches grow erect, and are perennial. It is a native of North America.

In the fourth the roots are many, slender and odorous: the stems many, trailing, slender, a foot or eighteen inches in length, angular, striated, branched, tough, and pliable, dark green, spreading on the ground: the leaves nerved, very dark-coloured, evergreen, on long petioles: the flowers axillary, crooked, longer than the leaves, of a dark purple colour on the outside, but yellowish within: the fruits like those of Long-rooted Birthwort, but smaller. It is a native of the island of Crete, or Candia. It flowers in May and June.

The fifth has the roots round and numerous: the stems angular, branching, seldom rising to a foot in height, and scarcely able to support themselves: a small heart-shaped bracte sits close at the base of the peduncle: the flower is small, the lip is bent inwards: the tube and beginning of the petal are yellow, the broader end blood-coloured: the fruit is petioled, ovate and grooved. It is a native of the south of France, &c.

Culture.—The two first sorts may be propa-

gated by sowing the seeds, which are often brought from abroad in pots of light earth in the autumn, as in September or the following month, plunging them in an old tan-bed, or putting them under a good garden-frame, in order to preserve them from the effects of frost during the winter, and in the spring bringing them forward by the assistance of a moderate hot-bed, gradually inuring them in fine weather as much as possible to the open air, water being occasionally given. In the following winter they will require to be placed under frames, or in the green-house. In the second spring some of them may be planted out in warm and rather shaded situations, and others into pots, to have protection a third winter when necessary, in order to their being planted in the open ground the following spring. They may also be readily increased by the creeping roots, either in the spring or autumnal season.

The three latter species are capable of being raised, either by sowing the seeds, which are received from abroad, in pots of fresh light earth in March, forwarding them by means of moderate hot-beds till they have attained some growth, or by planting slips from the roots, or cuttings in the spring. But in whichever method they are raised they must be potted in the autumn, and placed under the protection of a green-house or good garden-frame during the winter seasons afterwards, as much free air as possible being admitted in mild weather.

The third species is hardy enough to be planted out in the open ground in very warm situations, care being taken to guard it from the frosts in the winter.

Some of the sorts require the support of sticks, in order to give them an upright growth.

ARNICA, a genus comprising different herbaceous plants of the *Leopard's-tane* kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoidæ*.

The characters are: that the calyx is common imbricate, shorter than the ray of the corolla: the leaflets lanceolate, the length of the calyx, and erect: the corolla compound radiate: corollules hermaphrodite in the disk, and very numerous: the females in the ray about twenty: proper of the hermaphrodite tubular, erect, five-cleft, equal: female lanceolate, very long, three-toothed and spreading: the stamina to the hermaphrodites consist of very short filaments; antheræ cylindric: to the females filaments subulate, erect: antheræ none: the pistillum consists of an oblong germ: style simple, the length of the stamina: stigma bifid: no pericarpium: the

calyx unchanged: the seeds solitary and oblong: down simple; in the hermaphrodites pubescent and long: the receptacle naked.

The species are numerous; but those cultivated are chiefly *A. montana*, Mountain Arnica; 2. *A. scorpioides*, Alternate-leaved Arnica; 3. *A. crocea*, Saffron-flowered Arnica.

The first has the root woody, blackish, superficial, appearing as if cut off, having bunches of long fibres, perennial: the stem a foot or a foot and half high, but not more than six inches in alpine situations, obscurely angular, simple, terminated by three (sometimes only two or even one) upright peduncles, each bearing one flower, two inches in diameter, of a deep yellow colour, tinged with brown or russet and orange: the calyx is dirty green, cylindric and hairy, composed of fifteen or sixteen scales; in the ray about fourteen ligulate florets, twice as long as the calyx, a line or more in breadth, striated, three-toothed, having hairs at their base: the seeds oblong, blackish, roughish and hairy, crowned with a straw-coloured or russet-coloured down: the receptacle with deep excavations, on the edges of which are very small bristles, which make the whole seem a little hairy.

The second species has roots much jointed, dividing into many irregular fleshy offsets, which are variously contorted: the stems several, from six or eight inches to a foot in height, terminated by one handsome flower, of a deep yellow colour, two inches over: the root-leaves almost round or oval, deeply serrate, terminating suddenly in a short point, and placed on long petioles: the stem-leaves few, almost sessile: all soft, shaggy, and viscid: the calyx shaggy, open; the outer scales longer and wider: the ray of the corolla very open: the seeds a little hairy, short, crowned with an egret. It is a native of Switzerland.

The third has the crown of the root woolly: the root-leaves petioled, an inch and half or two inches long and an inch broad, rigid, smooth on the upper surface, generally oval, but sometimes heart-shaped: the scapes one-flowered, with a few linear bractæ: the florets of the ray are furnished with stamina. It is a native of the Cape.

Culture.—These plants are capable of being propagated by sowing the seeds in the early autumn in moist and rather shady situations. They often rise from the scattered seed. They may also be increased by parting the roots, and planting them out in similar situations at the same season, as immediately after the decay of the stems.

The third sort requires to be protected in pots

under a good garden-frame, or in the dry stove, and must have the same management as other plants of the tender exotic kind.

AROMATIC PLANTS are such as possess a fragrant aromatic flavour combined with an odoriferous smell in many of the sorts: some of them are employed as savoury sweet-herbs for various culinary purposes. The principal of them consist of under-shrubby and herbaceous perennials, and of annuals and biennials. Of the first kinds are thyme, sage, winter-savory, pot-marjoram, winter sweet marjoram, hyssop, rue, rosemary, fennel and lavender. These continue furnished with leaves in most cases all the year; but the herbaceous sorts renew their stalks and some of the other parts annually in spring and summer, as common mint, penny-royal, baum, fennel, tansy, tarragon, peppermint, and lovage. Of the latter kinds are sweet-marjoram, summer-savory, chervil, dill, marygold, basil, parsley, caraway, anise, and angelica. And among the perennial kinds, the principal culinary or pot-herb aromatics are thyme, sage, winter-savory, marjorams, mint, penny-royal, tansy, tarragon and fennel.

All of these aromatic herbs, except the basil, are mostly of hardy growth, so as to succeed in any common soil or situation; the perennial sorts continuing several years in the same plants, among which some are durable, both in root and top, and remain green for use all the year, as thyme, sage, winter-savory, marjoram, hyssop, rue, rosemary, &c.; while others are perennial only in root, and annual in stalk, as the mints, penny-royal, tansy, tarragon, and fennel, furnishing their respective produce for use, only in the spring, summer, and autumn.

The perennial aromatics are easily raised, either by slips, offsets, parting the roots, or by seed; and may be planted in spring, summer, or autumn, in beds or borders at from six to ten or twelve inches asunder; but the annual and biennial kinds continuing in the former only one season, and in the latter only till the second year, must be raised every year or two, according to the kind, from seed in the spring in any common earth in the open ground, except the basil, which being tender requires a hot-bed, in order to be transplanted in May and June: most of the others generally remain where sown in the natural ground, but may be occasionally transplanted, the sweet-marjoram and summer-savory in June, &c.; and likewise the angelica, as being of large growth, in summer.

As some of these only afford their useful parts at particular seasons, as mint, baum, penny-royal, tarragon, sweet-marjoram, &c., they should be cut and preserved at such times for

winter use, as about July and August; but for the marygold, chamomile flowers, and those of lavender, as well as sage-top, marjoram, hyssop, and such like, which often stand the winter, autumn may be better, as they will then be ready, in case of a severe winter. Parsley generally furnishes proper supplies of green leaves all the year; basil and dill only in summer; chervil and coriander, principally in summer and autumn, of the spring and summer sowings; or if some of each be also sown in August, they will continue green all winter; but the coriander requires a little protection in that season; and the caraway, anise, and angelica, continue only in summer and autumn.

In the culture of these plants, the perennial sorts, being planted in beds or borders, continue there, as just observed, several years, and only require to be kept clean from weeds in summer and autumn, and to be cut down, and the decayed stalks removed at the latter season; and in spring to give the beds, &c. a neat dressing, by clearing them of all weeds and litter, and then loosening the ground a little between the plants; and in some of the close running kinds, as the mints, &c., to spread some earth thinly over the general surface about them. When any particular sorts appear in a declining state, fresh plantations should be made in the proper season.

As to the annual sorts, they only require to be kept clean from weeds during their growth and continuance, and that fresh supplies be raised every year from seed.

ARTEMISIA, a genus comprising many perennial herbaceous and shrubby plants of the Mugwort, Wormwood, and Southernwood kinds.

It belongs to the class and order *Syngenesia Polygamia Equalis*, and ranks in the natural order of *Compositæ Nucamentaceæ*.

The characters of which are: that the calyx is common roundish and imbricate: scales rounded and converging: the corolla compound: corollules hermaphrodite, tubular, several, in the disk: females almost naked, in the circumference: proper of the hermaphrodite funnel-shaped: border five-cleft: the stamina in the hermaphrodites have capillary filaments, very short: the anthera cylindric, tubular, five-toothed: the pistillum in the hermaphrodites a small germ: style filiform, the length of the stamina: stigma bifid and revolute: in the females the germ very small: style filiform, longer than in the hermaphrodites: the stigma similar: no pericarpium: the calyx scarcely changed: the seeds solitary and naked: the receptacle flat, naked, or villose.

The species most cultivated are: 1. *A. Absinthium*,

thium, Common Wormwood; 2. *A. arborescens*, Narrow-leaved Tree Wormwood; 3. *A. argentea*, Broad-leaved Tree Wormwood; 4. *A. Libanotum*, Southernwood; 5. *A. Santoniæ*, Tartarian Southernwood; 6. *A. Dracunculæ*, Tarragon.

The first has a perennial branching root: the stems from a foot and half to two feet and upwards in height, upright, grooved, whitish with a very short nap, especially towards the top, branched, the branches making half a right angle with the stem: the leaves are petioled, pinnate-multifid, pinnae alternate (five to seven), the subdivisions, especially of the lower leaves, wide, irregular and unequal, the extreme segments blunt: they are tomentose on both sides, and very soft: the young ones silvery white, but as they advance the whiteness wears off till they become green to the eye on the upper surface: the lower leaves are on very long angular petioles, deeply channelled above: the leaflets are decurrent along the partial foot-stalks: on the stem-leaves they are narrower, and retain their whiteness longer: the uppermost leaves among the flowers are trifid or even simple, sessile and bluntly lanceolate: the flowers are in racemes, continued half the length of the stem, each from the axil of a leaf, directed one way, nodding: the calyx hemispherical, with scales bluntly ovate, very tomentose, having membranaceous edges: florets fifty and upwards in a single flower, dusky yellow, scarcely longer than the calyx: with about fifteen naked female florets in the circumference: the seeds are small, ovate, oblong, pale and naked: the receptacle flattish, covered with white silky villose hairs, shorter than the calyx. It flowers from July to October.

The second species rises with a woody stalk six or seven feet high, sending out many woody branches, with leaves somewhat like those of Common Wormwood, but more finely divided, and much whiter: the branches are terminated by spikes of globular flowers in the autumn, but are seldom followed by seeds here. It is a native of the Levant.

In the third the whole plant is of a silvery colour: the receptacle is villose. It is a native of Madeira, and flowers in June and July.

The fourth species is an under-shrub seldom rising more than three or four feet high: the leaves are alternate, petioled, multifid; leaflets linear, very narrow, pale green, tomentose-scabrous; less divided towards the top, till they become trifid and even linear next the flowers; which come forth in linear, upright racemes, or spikes, from the axils at the extremities of the branches, on one-flowered peduncles: they are small, abundant, nodding, and yellow; but

rarely open in this climate. It is a native of Italy.

The fifth is upright: the stem panicled, rather hoary: the lower leaves pinnate-multifid, linear, hoary: branches wand-like: the racemes or spikes alternate, recurved, with the flowers all directed the same way; the pedicels with here and there linear, bluntish, recurved leaves: the flowers solitary and cylindric. In the fruiting plant all the stems are upright, and lose their hoariness: the leaves on the branches are very small, linear and undivided: the receptacle naked. It is a native of Persia, and flowers from September to November.

The sixth species has the root perennial: the stem stiff, smooth, branching, from a foot to two feet in height: the leaves petioled and green on both sides: two or three peduncles from the axils, pressed to the branch: the flowers are in a kind of spike, all directed the same way: calyxes roundish, with oblong, smooth, imbricate scales: florets yellow, small: hermaphrodites twelve; females six: the seeds reddish-brown, streaked and naked: the receptacle is flat, glutinous, honeycombed and naked. It is a native of Siberia, and flowers in August.

Culture.—These plants may be propagated with facility in different ways, according to the different sorts. The first may be easily raised, either from the seeds sown in the autumn, or by suffering them to scatter. It may likewise be increased by parting the roots, or from slips planted out in the summer season.

The second and third species may be increased from cuttings, by planting them in shaded situations in the summer season, water being frequently given them until they have strucken root. In autumn the young plants should be removed into pots, and have the protection of a garden-frame during the winter. In mild winters they sometimes succeed on a warm border.

The fourth species is readily increased by slips or cuttings planted out in shady places in the early spring months, water being occasionally given when the weather is dry till the plants have taken root. In the autumn the plants should be removed into pots, or the places where they are to remain. The fifth sort may be managed in the same way; but should have a more dry soil and sheltered situation, and a few plants potted to be placed under a frame during the winter.

The last sort is readily propagated by its creeping roots, or by planting the young shoots in April or May in the same manner as in mint, water being freely given when the season is dry. This is a hardy perennial, used in salads for its

warm stomachic property. The leaves may likewise be employed as a pickle.

Some of these plants may be made use of, as being ornamental, in clumps and borders for variety, and the tree kinds may have a place in the green-house.

ARTICHOKE. See CYNARA.

ARTICHOKE, JERUSALEM. See HELIANTHUS.

ARTOCARPUS, a genus comprehending trees of the tall-growing exotic kind.

It belongs to the class and order *Moracea Monandria*, and ranks in the natural order of *Urtica*.

The characters are: that in the male flowers there is no calyx: the antherum is cylindrical, all covered with florets: the corolla to each two petals oblong, concave, blunt and villose: the stamina consist of a single filament within each corolla, filiform, the length of the corolla: the anthera oblong: female flowers on the same tree, neither calyx nor corolla: the pistillum consists of very many germs, connected into a globe, hexangular: the style to each filiform: the stigma single, or two, capillary and revolute: the pericarpium an ovate-globular fruit, compound, muricate: the seeds for each germ solitary, oblong, and covered with a pulpy aril, placed on an ovate receptacle.

The species are: 1. *A. incisa*, Bread-fruit Tree; 2. *A. integrifolia*, Indian Jaca Tree.

The first is described in Cook's Voyages, as being, in its native situation, a tree about the size of a middling oak: its leaves are frequently a foot and half long, oblong, deeply sinuated like those of the fig-tree, which they resemble in consistence and colour, and in exuding a milky juice when broken. The fruit is the size and shape of a child's head, and the surface is reticulated not much unlike a truffle: it is covered with a thin skin, and has a core about as big as the handle of a small knife; the eatable part lies between the skin and the core: it is as white as snow, and somewhat of the consistence of new bread. It must be roasted before it is eaten, being first divided into three or four parts: its taste is insipid, with a slight sweetness somewhat resembling that of the crumb of wheaten bread mixed with Jerusalem Artichoke. It is a native of the South Sea Islands, and has been lately introduced into the West Indies.

It is useful not only for food, but also for clothing; for the bark is stripped off the suckers, and formed into a kind of cloth.

The principal varieties of this tree are, that in which the fruit is destitute of seeds, and that in which they are found. Martyn observes, that

the latter may be considered as the tree in a wild state; and that the want of seeds is probably owing to cultivation. The natives of Otaheite reckon at least eight varieties of that without stones, differing in the form of the leaf and fruit. One of these they name *Uru* or *Eoroo*: this has a globular, smooth, even fruit, and is the most common. A second, named *Maira*, has an oval, smooth fruit, with the leaves more deeply cut. A third, called *Patea*, has the fruit oblong and rugged, as it were scaly. A fourth, *Taturra*, has an oval fruit, with mammillary germs mucicated by the permanent style. The same writer remarks, that probably by extending the culture to distant countries we shall hereafter find the varieties much increased:

The parts of fructification in those trees which bear fruit without stones are said to be defective. The amentum never expands; the styles are likewise deficient.

In the former variety the fruit contains a considerable quantity of seeds, almost as large as Chestnuts, oblong, somewhat angular, produced into a point at each end, separated by several little membranes or coats, formed by the abortion of some of the germs: they are attached to a fleshy and very considerable placenta, which occupies the centre; are farinaceous, like the Chestnut, and eaten in some places by the savage inhabitants, either boiled, or roasted in embers. It will easily be supposed that this fruit, abounding less in pulp, and being both more fibrous and less juicy than that which has no seeds, must be much inferior, as an article of food: and accordingly, before the discovery of the South Sea Islands the Bread-fruit had not acquired that degree of reputation which it is now found to deserve.

The second species is about the same size with the foregoing, or larger: branches alternate, spreading: the twigs hirsute with long stiff hairs: the leaves alternate, petioled, ovate-oblong, blunt with a blunt point, obscurely serrate, undivided, nerved; bright green and very smooth on the upper surface, paler beneath and hirsute with stiff hairs, spreading, a span in length: the younger leaves are evidently toothed, but the teeth disappear afterwards: sometimes a leaf or two may be gashed: the petiole is somewhat triangular, smooth, an inch in length: stipules as in the foregoing: the flowers male and female distinct on the same stem or branch: the peduncle either simple or branched, pendulous, an inch thick, and a foot long: the pedicels three, five, or more, the length and thickness of a finger: the fruit

weighs thirty pounds and upwards: it has within it frequently from two to three hundred seeds, three or four times as big as almonds; they are ovate-oblong, blunt at one end, sharp at the other, and a little flattened on the sides. It is a native of the East Indies.

The two species cannot be distinguished with certainty, either by the form of the leaves or the situation of the fruit; for the leaves in this are sometimes lobed, as in that; and the situation of the fruit varies with the age of the tree, being first borne on the branches, then on the trunk, and finally on the roots. When cultivated here their growth is much restricted.

Culture.—In those varieties which bear seeds, each of the species may be propagated either by seeds, suckers, or layers. They may be sown in a pot of rich earth, and plunged in the bark-bed. Those which have no seed in the fruit may be increased from suckers, in which they abound very much, or by layers. In hot climates they succeed best in a rich soil; for though they will grow in an indifferent one, yet they by no means arrive at that magnitude, nor is their fruit so well flavoured, as when they are planted in a good one. Where the suckers are made use of, they should be taken off in the spring, and planted in pots in the stove. If the layer mode be employed, the young shoots should be laid down in the spring or summer, which may be taken off in the following spring, and placed in pots in the stove. The management is afterwards the same as in other exotic trees.

ARUM, a genus comprehending plants of the herbaceous, perennial, and exotic kinds.—The Cuckow-Pint.

It belongs to the class and order *Gynandria Polyandria*, and ranks in the natural order of *Piperitæ*.

The characters of which are: that there are male and female flowers on the same spadix, being closely set together between a double row of threads: the calyx is a one-leaved spathe, very large, oblong, and convolute at the base, converging at the top, the belly compressed and coloured within: the spadix club-shaped, quite simple, a little shorter than the spathe, coloured and fenced at the bottom with germs, shrivelling above them; no proper perianthium; no corolla: the nectaries are thick at the base, ending in threads or tendrils, in two rows, issuing from the middle of the spadix: the stamina have no filaments: the antheræ are sessile and four-cornered: the female flowers are on the lower part of the spadix, close to each other: the calyx being a common spathe and spadix, as in the males; no proper perianthium; no corolla: the pistillum

is an ovate germ; no style: the stigma bearded, with villous hairs: the pericarpium is a globular one-celled berry: the seeds several and roundish.

The species chiefly cultivated are: 1. *A. Italicum*, Italian Arum; 2. *A. Arisurum*, Broad-leaved Arum, or Friars Cawl; 3. *A. Dracunculius*, Long-sheathed Arum, or Common Dragon; 4. *A. Dracontium*, Short-sheathed Arum, or Green Dragon; 5. *A. Colocasia*, Egyptian Arum; 6. *A. trilobatum*, Three-lobed Indian Arum; 7. *A. bicolorum*, Two-coloured Arum; 8. *A. arborescens*, Tree Arum; 9. *A. seguinum*, Dumb-cane Arum.

The first, according to Martyn, has the stem five feet high, as thick as the human arm, usually upright: the leaves very large, slightly acuminate, with many transverse, parallel ribs; on long, awl-shaped, erect, stem-clasping petioles: the spathe axillary, small, acute, straight and convolute: the spadix awl-shaped, erect; with the female florets inserted at the base: the berries roundish, pale and small. It is a native of the East Indies.

The second species has the spathe entire above, and bent in a little; below it is also entire, and not convolute: the root is oblong and thick; the height about a foot and half: the leaves are sharpish; spathe shorter than the leaves: the spadix curved, and the berries red, with one seed in each. It is a native of the south of France, &c.

The third sort has a large, tuberous, fleshy root, which in the spring puts up a straight stalk about three feet high, spotted like the belly of a snake; at the top it spreads out into leaves, which are cut into several narrow segments almost to the bottom: at the top of the stalk the flower is produced, which is in shape like the common Arum, having a very long spathe of a dark purple colour, standing erect, with a large spadix of the same colour, so that when it is in flower it makes no unpleasing appearance. It is a native of the southern parts of Europe.

The fourth species grows about eight or nine inches high: the root is roundish, solid, white within and without, smooth: the leaves are petioled, upright, smaller than those of the foregoing: the leaflets broad-lanceolate, and commonly in threes: the spadix awl-shaped, slender, longer than both spathe and leaves. It is a native of America, and flowers in June.

The fifth has a tuberous, thick, large, oblong root, rounded at the base: the leaves are thick, smooth, ash-coloured, in form and size resembling those of the Water-Lily, having thick ribs running obliquely to the edge: the petioles

are thick, upright, roundish, whitish, and spreading out at bottom: the scape short, with a subulate, reflex, flat spathe: the spadix subulate, shorter than the spathe. It is a native of the Levant, &c.

In the sixth species the root is roundish, compressed, smooth, half an inch in diameter: the plant a foot high, and upright: the leaves cordate at the base, three-lobed, large, few: the lobes ovate and sharpish: the petioles are long, angular, striated, widening at the base, and concave: the scape shorter than the leaves: the spathe very wide, flat, acuminate and dusky red: the spadix subsessile, subulate, shorter than the spathe; with male flowers at the tip, female at the base, and very many long flexuose red hairs in the middle. It is a native of Ceylon, and flowers in May and June.

The seventh is without stem: the leaves are halbert-shaped, and entire from the root, with the disk coloured, the middle of the sheath narrowed, and the lamina erect, pointed, roundish, and almost convolute. It flowers in June and July.

The eighth species has an erect jointed stalk, six feet in height, with arrow-shaped leaves in clusters at top; the flowers coming out between the leaves in long green spathes, close to the stem.

The ninth has the leaves sometimes punched with holes: it rises to the height of six or seven feet with a green jointed stalk as large as a walking-cane: the leaves are placed irregularly at the top of the stalks, growing in a cluster; they are oblong, and of a light green colour: from between the leaves the flowers come out on the side of the stalk, having a long spathe of a pale green colour, marked with white spots, sitting close to the stem of the plant: at the first appearance it stands erect, soon after it becomes horizontal, and in a little time declines downward: the lower part is swelling so far as the flowers are ranged on the spadix, above which it is greatly contracted, and toward the top enlarges again, where it is a little open, so as to show the naked part of the spadix, but is twisted again at the top: all the lower part folds closely over the spadix, so that it is scarcely discernible, unless the spathe be opened; which can only be done on one side, the other adhering closely to the spadix, so far upward as the flowers extend the naked part of the spadix only being separated from the spathe; so that the female flowers and stamina are ranged only on one side of the spadix; in which it differs from the other species. It is a native of the warm parts of America.

Culture.—In this genus of plants the propagation is mostly effected by means of offsets, or parting the roots, which may be done either in

the autumn or spring months. With the hardy sorts, as the three first, the planting may be performed in the common borders; but in the tender kinds, as the fourth, fifth, sixth and seventh species, it should be in pots of light earth, in order to be promoted in their taking root by a gentle hot-bed. They are afterwards to be kept in the bark-stove. When kept in shelves in the dry stove they do not succeed so well. The sixth and seventh sorts require to be guarded from cold by being placed in the tan-bed of the stove.

The two last species may be propagated by cuttings of the stems three or four joints in length, which, after being sufficiently dried, so as to heal the cut parts, may be placed separately in small pots of light sandy mould, and plunged in a moderate tan hot-bed, no water being given till they are well rooted. They should be constantly retained in the stove.

Such of the hardy kinds as produce seeds, may also be raised by sowing them in pots in the autumn, which should be placed in a gentle hot-bed in the early spring months, to promote their germination and growth.

The three first are curious, and serve to afford diversity in the borders and clumps of pleasure-grounds; but the *Dracunculus*, though a singular plant, is disagreeable from its unpleasant smell. The others are kept in the stove for the purpose of variety.

ARUNDO, a genus comprising plants of the herbaceous, perennial, and reed kind, some of which are of rapid growth.

It belongs to the class and order *Triandria Digynia*, and ranks in the natural order of *Gramina*.

The characters of which are: that the calyx is a one- or many-flowered, two-valved, erect glume: the valves oblong, acuminate, awnless, one shorter than the other: the corolla is two-valved, the valves the length of the calyx, oblong and acuminate, a *lanugo* arising from their base, almost the length of the flower: the nectary two-leaved, and very small: the stamina consist of three capillary filaments: the antheræ forked at both ends: the pistillum is an oblong germ: the styles are two, capillary, reflex and villose: the stigmas simple; there is no pericarpium: the corolla adheres to the seed without gaping: the seed is single, oblong, acuminate at both ends, and furnished with a long down at the base.

The species mostly cultivated are: 1. *A. Donax*, Cultivated Evergreen or Portugal Reed; 2. *A. Bambos*, Bamboo-Cane, or Great Indian Reed; 3. *A. colorata*, Reed Canary-grass.

The first, in its natural situation, has the culm six feet high or more, (ten, fifteen, and according to some authors twenty or thirty feet) hard, almost

woody, with knots or joints and diaphragma. Above each joint is a leaf, embracing the culm with a yellow, hollow sheath, two feet long, and three inches broad. The top of the culm ends in a point, the leaves rolling up in form of a cone. The panicle is a foot and half long, erect, and many-flowered. There are two flowers, and sometimes three in one calyx, but two only ripen. The calyxes are in general considered as three-flowered; but in the late editions of the *Systema Vegetabilium*, Martyn observes, "that they are given as five-flowered, on the authority of Turra." It is a native of the south of Europe, &c. and flowers here in July and August.

There is a variety with variegated leaves called *Striped or Parti-coloured Reed*, but which never grows to a third part of the height of the other, and the leaves are narrower and much shorter.

The second species has a woody, hollow, round, straight culm, in its native situation, forty feet high and upwards, simple and shining: the internodes a foot in length and circumference: sheaths thick, hairy, rough, convolute, deciduous: branches alternate, slender, solid, spiny, reclining, springing out from the base to the very top; the lower ones being usually cut off: the leaves small, quite entire, lanceolate, roundish at the base, striated, rough, on alternate round petioles. The hollow internodes of the culm are frequently found filled with a limpid liquor, which in India beyond the Ganges is not condensed into the substance called *Tabaxir* or *Tabasheer*, as it is, though rarely, in Malabar. The panicle of flowers is diffused, in spikes; spikelets oblong, imbricate: the calyx is two-valved, one-flowered; the valves acute, and convolute: the corolla two-valved, membranaceous, very small, and surrounded with hairs: stamina six, filaments very short, antheræ oblong: stigmas three, sessile, long and villose: seed one, oblong. It is a native of most of the tropical regions, and may be raised here in the stove.

The third has a perennial root, long, thick, jointed, creeping, covered with whitish or brownish scales: the culms from two or three to five or six feet in height, upright, strong, round, smooth, with six or seven purplish or brownish knots; at each of which is a leaf from a hand to a span, a foot in length, and from five to eight lines in breadth, smooth except towards the end and on the sides, where they are somewhat scabrous, bright green, white about the edge, and with a white nerve: the sheaths striated, smooth, ending in a whitish, cloven ligule: the panicle from six inches to a foot in length, much contracted at first so as to resemble a spike, but spreading out in flowering time, branched, the branches crowded, closely

imbricate, and unequal; it varies in colour, being commonly purplish, but sometimes whitish: the peduncles in pairs or three together, the lower ones connected at the base, having a sharp little scale for a bracte: the florets imbricate, pointing one way, when flowering diverging on very short pedicels. The valves of the calyx with two ribs on each side, not much longer than the corolla, the outer valve a little less than the other. The valves of the corolla hairy at the edges, and furnished with a small, slender, hairy appendage on each side, the outer valve not rolled in. The nectaries two, lanceolate-acuminate, with one tooth on the outer edge. The seed oval, flattened, brown, and shining.

There is a variety of this grass cultivated in gardens, which has beautiful striped leaves, generally green and white, but sometimes with a purplish cast. It is known by the names of *ladies' laces*, *painted grass*, and *ribband grass*.

Culture. The first species, though a native of a warm climate, is sometimes capable of resisting the cold of our winters in warm situations, where the soil is not too retentive of moisture, especially if a little litter be applied over the roots, when they prove severe.

It is propagated by parting the roots in the latter end of February or beginning of March, previous to the shooting forth of the new stems. They mostly shoot the same season, but seldom in a vigorous manner until the second or third year, when several stems proceed from the same stool.

The chief culture which it requires is that of being well supplied with water in dry seasons, and having the stems cut down and cleared away annually in the autumn.

The variegated variety, as being more tender, should be protected from the frost during the winter season.

The second sort only admits of being raised in well-regulated stoves in this country, in which it is sometimes capable of attaining considerable growth. It is propagated by taking off slips from the roots in the very early spring months, and planting them in large pots or tubs filled with good earth, which should then be plunged in the bark-bed in the stove or hot-house, full supplies of water being carefully afforded. If the roots of the plants be permitted to extend themselves in the tan of the beds, as the tubs decay they will grow with greater vigour; but great care must be taken in these cases not to disturb their roots on the refreshing or renewal of the beds.

The variety of the third species usually employed may be easily multiplied by dividing the roots in the autumnal season, and planting them

out again in the clumps, borders, or other places where they are intended to grow. The plants require no further culture, except that of clearing away the stems in the autumn.

The first kind affords variety by the singularity of its growth among the larger plants in the borders and other parts of pleasure-grounds. The second is preserved in the stove for the sake of curiosity. And the last is chiefly valuable for the diversity which it creates among the smaller herbaceous plants in clumps and borders.

ASARUM, a genus containing plants of the low herbaceous perennial kind.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters of which are: that the calyx is a one-leaved bell-shaped, three- or four- cleft, coriaceous, coloured, permanent perianthium; the clefts are erect and bent in at the top; no corolla; the stamina consist of twelve subulate filaments, half the length of the calyx; the anthers oblong, and fastened to the middle partition of the filaments: the pistillum is an inferior or concealed germ within the substance of the calyx: the style is cylindric, the length of the stamina: the stigma is stellate, six-parted, the parts reflex: the pericarpium is a coriaceous capsule within the substance of the calyx, being mostly six-celled. There are several ovate seeds.

The species of most note in garden culture are: 1. *A. Canadense*, Canadian Asarabacca. 2. *A. Virginicum*, Virginian Sweet-scented Asarabacca.

In the first the roots are perennial, thick, and fleshy, sending out many fibres. The leaves rise from the root, are much larger than in those of common asarabacca, and stand on longer foot-stalks; they are pointed and hairy. The flowers are like those of the other sort, growing close to the root, but are more inclining to green on the outside. It is a native of Canada, and flowers from April to July.

In the second species the leaves are veined and spotted on their upper surface, like those of the autumnal Cyclamen. The flowers are shaped like the others, but stand on longer peduncles, and are of a darker purple colour. They come out in April and May, and their seeds ripen in July and August. It is a native of Virginia and Carolina.

Culture.—These are hardy plants, of easy culture. They succeed to most advantage in situations which are moist and shady. They are propagated by parting the roots in the autumnal months, which should be planted out in the fronts of clumps or borders where they are to remain. In the Canadian sort, when the soil is too retentive

tive of moisture, the roots are apt to rot in the winter season.

The second kind succeeds best when planted in such a situation as not to be too much exposed to the sun during the day.

From their low growth they are less ornamental than many others, especially the first sort, but afford much singularity in their mode of flowering as well as their flowers, on which account they should always occupy the front situations in the places where they are planted out.

ASCLEPIAS, a genus comprising various plants of the flowery, perennial, herbaceous, and shrubby exotic sorts; and of the Swallow-wort and Dog's-bane kinds.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Convolvaceae*.

The characters of which are: that the calyx is a five-cleft, sharp, very small, permanent perianthium. The corolla monopetalous, flat or reflex, five-parted: the divisions ovate-acuminate, slightly bending with the sun. The nectaries five, growing to the tube of the filaments below the anthers, fleshy, or cowed; protruding from the bottom a sharp horn, bending inwards. The stamina consist of five filaments collected into a tube, swelling at the base: the anthers oblong, upright, and two-celled, terminated by an inflex membrane lying on the stigma, having a reversed wing on each side, growing broader downwards with its edge contiguous to the next. The pollen is collected into ten corpuscles, inversely lanceolate, flat, hanging down into the cells of the anther by short threads, frequently flexuose; which are annexed by pairs to five cartilaginous, twin tubercles, each placed on the tip of the wings of the anthers, adhering to the angles of the stigma, between the anthers. The pistillum consists of two oblong acuminate germs; styles two, subulate: stigma common to both, large, thick, five-cornered, covered at top by the apexes of the anthers, umbilicate in the middle. The pericarpium has two follicles, large, oblong, acuminate, swelling, one-celled, one-valved. The seeds numerous, imbricate, crowned with down: the receptacle is membranaceous and free.

The species are very numerous, but those most commonly in cultivation are; 1. *A. vinetoxicum*, Common Swallow-wort, or Tame-poison; 2. *A. nigra*, Black Swallow-wort; 3. *A. Syriaca*, Syrian Swallow-wort, or Dog's-bane; 4. *A. purpurascens*, Purple Virginian Swallow-wort, or Dog's-bane; 5. *A. verticillata*, Verticillate Swallow-wort; 6. *A. decumbens*, Decumbent Swallow-wort, or Dog's-bane; 7. *A. tuberosa*, Tuberous-rooted Swallow-wort, or Dog's-bane; 8. *A. variegata*, Variegated Swallow-

wort; 9. *A. arborescens*, Arborescent Swallow-wort; 10. *A. fruticosa*, Shrubby or Willow-leaved Swallow-wort; 11. *A. undulata*, Wave-leaved Swallow-wort; 12. *A. crispa*, Curled-leaved Swallow-wort; 13. *A. Curassavica*, Curassoa Swallow-wort, or Bastard Ipecacuanha; 14. *A. volubilis*, Twining Swallow-wort; 15. *A. gigantia*, Curled flowered Gigantic Swallow-wort.

The first species has the root very large and much branched: it is composed of many strong fibres, which are connected at the top, like those of Asparagus. From this arise many stems, in number proportioned to the size of the root, near two feet high, very slender at the top, woody, round, hairy, and not branched. The leaves are cordate-ovate, acuminate, smooth, hardish, quite entire, glaucous-green, the midrib and sometimes the edge of the leaves a little hairy: the petioles short. Peduncles axillary, many-flowered, resembling prolificus umbels. The calyx small, green, divided at the end into five bristles. The corolla is commonly white: the follicles ovate-acuminate: the seeds small, brown, and wrapped in white cotton. It flowers in June, sometimes in May, and continues flowering to August, and is a native of most parts of the continent of Europe.

It is said to vary, with yellow flowers; and there is a variety with broader leaves.

The second species agrees with the above in the shape of its roots, leaves, and flowers; but the stalks extend to a greater length, and toward their upper part twist round any sticks or other plants near them; and the flowers are black.

It is by no means so common as the foregoing, having been found only in the south of France, the mountains about Nice, and in Spain. It flowers at the same time with the other.

The third creeps greatly at the root, and sends up strong stems upwards of four feet high; towards the top of them the flowers come out on the side; these are of a worn-out purple colour, smelling sweet; and sometimes they are succeeded here by large oval pods. It flowers in July, and is a native of North America. The French in Canada eat the tender shoots in spring as Asparagus. The flowers are highly odoriferous.

The fourth species has many stems, as thick as the little finger, at bottom quadrangular with blunted angles, and of a brownish green colour; above round and green, a little hairy. The leaves are on short petioles, from four to six inches long, and two or three broad; the midrib purple. The flowers have the petals of a dusky herbaceous colour, the horns of the nectaries pale and gaping, not erect but horizontal. It is a native of North America, and flowers from July to September.

The fifth species rises with slender upright stalks, at the top of which grow umbels of small white flowers, appearing in July, but never succeeded by pods in this climate. The leaves are frequently four together. The peduncles forming an umbel are opposite to the leaves. It is a native of North America.

The sixth has declining stalks, which are hairy, and eighteen inches in length. The leaves are narrow. The umbels grow at the extremity of the branches, are compact, and the flowers of a bright orange colour. It is a native of North America.

In the seventh species the stems are a foot high, hairy, round, and dusky red. The leaves alternate, except on the upper part of the stem. Below where it branches are generally two leaves, and at the place of branching four: on the branches themselves the leaves are again alternate. The flowers are of a bright orange colour. The tuberous roots very large. It is a native of North America, and flowers from the end of July to September, sometimes ripening seed in this climate.

The eighth, according to Linnæus, is allied to the third; but Dillenius thinks that it approaches very near to the *Amœna*, but that the stems are shorter, and commonly variegated with dusky purple spots; the leaves broader and rounder, more excavated, less rigid, not shining or hoary underneath, with the oblique veins deeper, so as to be even grooved; the flowers larger, pale, dusky flesh-coloured, sweet-smelling, the horns of the nectaries standing out and gaping more.

According to Miller, it resembles the fourth sort, but the leaves are rough, and the umbels of flowers more compact; they come out on the side of the stalk, are of an herbaceous colour, and are not succeeded by pods in this climate. It is a native of North America.

In the ninth species the stem is shrubby, rough with hairs, upright, as thick as the finger. The leaves opposite, on very short petioles, ending rather obtusely, but with a minute point, and smooth. The peduncles from the summit of the stem, umbelled, villose. The corollas are white. It is a native of the Cape of Good Hope, and flowers in December.

In the tenth the nectaries are compressed without a claw, instead of which are two long reflex ears. The follicles are inflated, and set with soft prickles. It is also a native of the Cape, and flowers from June to September.

The eleventh is a native of the Cape of Good Hope, and flowers here in July.

The twelfth has the stem pubescent, branching at bottom. The leaves sessile, repand.

One umbel of yellow flowers terminates the stem. Found at the Cape of Good Hope.

The thirteenth species has the stem from a foot to two or three feet in height, upright, simple, or generally so, round, pubescent, and milky. The leaves opposite and decussated, petioled, acute, entire, and smooth on both sides. The flowers in umbels; umbellules terminating, or opposite to the terminating leaflet in pairs, peduncled. Involucre none, but only a few subulate leaflets. The peduncle the length of the leaves; pedicels shorter, one-flowered. Calyx of five, lanceolate, reflex leaflets; corolla reflex. Nectaries five, round the middle corpuscle, ovate, ear-cowled obliquely inwards, with a little horn from the nectarous base sabre-shaped bent inwards. In the middle is a truncate corpuscle, hollowed at the tip, bluntly five-cornered, covered with five scales at the sides, and gaping with as many clinks. Scales hollowed within. Glands five, roundish, black, to which are fixed above, within the scales, pairs of glanduliferous pedicels, in place of anthers; these glands are oblong, pellucid, panduriform, and filled with prolific moisture. Germs two, ovate, acuminate; styles two, subulate, hid within the column; stigmias simple, and obtuse. Follicles oblong, acuminate, toothless, ventricose, and smooth. It is a native of South America, the West-Indian Islands, and China near Canton, and flowers from June to September.

The fourteenth species is quite smooth, with shining branches. The leaves petioled, ovate-subcordate, and veined. The umbels quite simple, on peduncles the length of the petiole. The flowers greenish. It is a native of Malabar, Ceylon, &c.

The fifteenth rises to six or seven feet in height. The leaves are thick; the flowers white; the pods very large; the base of the petiole bearded above. The nectaries do not put forth awl-shaped horns, but solid converging plates. It flowers from July to September.

Culture.—The method of propagating the different hardy kinds, as the first eight species, is by parting the roots and planting them out, either in the autumn as soon as the stems decay, or in the early spring months before the new shoots are protruded. They require a rather dry soil, as when there is too much moisture they are apt to have their roots destroyed by it in the winter season. They are likewise capable of being raised from seed, when it can be procured, by sowing it in beds or pots of light fresh earth in the spring months. With the seventh and eighth species, the pots should be plunged in a hot-bed,

and as soon as the plants present themselves they should be exposed gradually to the influence of the open air to strengthen their growth, and when sufficiently vigorous, be either pricked out on warm borders, or in the situations where they are to remain. In the former method they must be transplanted the March following into the places where they are to grow. In either mode occasional shade and water must be provided, and in the winter the roots be protected from the action of the frost by being covered with old tan, litter, or mats. These two sorts may also be occasionally increased by planting the offsets in the early spring.

They last many years when proper care is taken of them in the winter; but do not bear frequent removing well, or flower so strongly under such circumstances.

In the culture of the ninth and three following sorts the protection of a green-house is essentially necessary in the winter season.

The ninth and tenth kinds may be increased either by seeds or cuttings. In the first manner the seed should be sown in small pots filled with a light earthy compost, placing them in a hot-bed; and when the plants have attained a proper degree of size and strength they must be pricked out into separate pots, a due degree of shade and water being given till they have stricken fresh root, and afterwards as occasion may require.

The eleventh, twelfth, and other Cape sorts, may be propagated by sowing the seeds in the latter end of March or beginning of April on a moderate hot-bed, covered with light mould, under glasses, or even sometimes in the open air; and when the plants are become sufficiently strong and a few inches in height, they may be placed out into separate small pots filled with light fresh earth, being at first properly shaded and supplied with moisture; after being fully rooted they may be exposed in warm situations in assemblage with other exotic plants till the beginning of the autumn, when they must receive the shelter of the green-house.

The principal attention which is afterwards necessary with plants of this description is, that of properly potting them as they increase in size, and carefully exposing them in the open air during the summer months.

These sorts are likewise capable of being raised by setting the cuttings of the shoots in the latter end of the summer in shady situations, and after they have stricken good roots carefully removing them into pots, to be managed as the seedling plants.

The thirteenth and following kinds require to be kept constantly in the stove of the hot-house.

They may be increased by sowing the seeds in the spring either on a hot-bed, or in pots, and plunging them into the hot-bed; the plants, when sufficiently grown, being in the first mode transplanted into separate pots of good earth, to be, as in the latter method, plunged into the tan-bed in the stove of the hot-house. Plants of the thirteenth species should be annually raised, as they decline in the production of flowers after the first year.

The first kinds may be employed in the fronts of the clumps and borders of pleasure- or other grounds, where they have a good effect in mixture with other plants of similar growth.

The second sorts afford an agreeable diversity in the green-house during the winter, and in the compartments about the house in the summer season.

Those of the last description present a pleasing variety among other stove plants.

ASCYRUM, a genus furnishing plants of the perennial shrubby kind. The St. Peter's-wort.

It belongs to the class and order *Polyadelphia Polyandria*, and ranks in the natural order of *Rotaceæ*.

The characters of which are: that the calyx is a four-leaved perianthium: the outer leaflets opposite, very minute, linear: the inner heart-shaped, large, flat, erect: all permanent. The corolla has four ovate petals; the outer opposite, very large, the inner less. The stamens consist of numerous filaments, bristle-shaped, slightly united at the base in four parts. The anthers are roundish. The germ oblong. Style scarcely any. Stigma simple. The pericarpium is an oblong capsule, acuminate, one-celled, two-valved, inclosed by the larger leaves of the calyx. The seeds numerous, small, roundish, and fixed to the edge of the valves.

The species cultivated for ornament are, 1. *A. hypericoides*, Shrubby St. John's-wort, like *Ascyrum*. 2. *A. villosum*, Hairy St. Peter's-wort.

The first is an elegant little shrub, seldom rising above three feet in height. It is very full of leaves and branches. The branches are dichotomous; the twigs compressed and acutical. The leaves opposite, subsessile, lanceolate, obtuse, entire, very finely perforated, and smooth; and at their base are very small glands. The flowers terminating, peduncled, solitary, and yellow. Two leaflets of the calyx are four times as big as the two others, and inclose them; they are heart-shaped, blunt, and smooth. Corolla cruciform; petals the size of the larger leaves of the calyx, and spreading. The filaments are distinct, upright, surrounding the

germ the length of the petals. The germ oblong, sharp, and compressed: the styles two, very short: stigmas blunt: the capsule is compressed, being covered with the shrivelled calyx. It is a native of South Carolina.

The second species grows about three feet high. The flowers are produced at the ends of the stalks, and are of the same shape and colour with common St. John's-wort. It grows naturally in Virginia.

Culture.—The best method with the first sort is to propagate it by cuttings made from the young shoots in May, as it rarely produces seeds in this climate. These should be planted in pots of good earth, and plunged into a moderate hot-bed, till they have stricken root, and the plants are become strong, when they may be transplanted into the situations where they are to remain, in the borders or other parts. A warm aspect should always be chosen for the purpose, and the roots must be protected, especially in severe winters, by being covered with tan, litter, or other similar substances. This sort may likewise be raised by layers put down in autumn.

The second kind may be increased by parting the roots in the autumn after the stems are decayed, planting them in situations where the soil is of a loamy quality. These after some time often produce seed. They should constantly be guarded from the action of frosts in the winter season.

These two species are useful in affording variety in extensive pleasure-grounds.

ASH Common. See FRAXINUS.

ASH Flowering. See FRAXINUS.

ASH Manna. See FRAXINUS.

ASH Mountain. See SORBUS.

ASH Poison. See RHUS.

ASHES, the particles of different ligneous and other substances which remain after the process of combustion. They are of different kinds; but those mostly employed in garden culture are *wood, turf, coal, and peat* ashes. Their effects on the soil vary in some measure according to the kinds. Such as contain saline matter in any proportion not only afford improvement on the stiffer and more tenacious sorts of ground, by rendering them more friable and mellow, but by their action upon them bringing them into a more fit condition for supplying the nourishment of plants. Mr. Nicol found where the ashes of green furze had been thickly spread on the surface, and afterwards dug into the earth, that when they had remained some time in that state of union, they produced the most beneficial effects in promoting the growth of different sorts of trees. In this view, therefore, the use of wood and turf ashes may

be of much advantage in bringing such new garden-grounds as are of a stiff adhesive quality into a condition proper for the growth of different kinds of vegetable crops. And where the grounds are too much inclined to moisture, they may be of great utility by the power which they possess of taking up the superabundant proportion of wetness. And it is not improbable but they may likewise contribute in the way of affording the food of plants.

Coal-ashes, probably from their containing a portion of calcareous matter, are also found to be highly beneficial on stiff and retentive garden-grounds, in rendering them more open and porous. In this view they are successfully used in the neighbourhood of many great cities where coal is much burnt for fuel. They also open the texture of clayey grounds, and correct their tenacity and other bad qualities. The gardeners about London know their value, and make a very profitable use of them, particularly in bringing into order those grounds which have been dug up for brick earth. And it is probable that peat-ashes may be made use of in the same intention with great benefit, as they have the property of lessening the adhesion of such soils.

The proportions in which manures of these kinds may be employed must depend in a great degree on the state of the grounds; but too sparing quantities can seldom be advantageous, where the principal object is that of rendering them more light and open. In the application of the two first sorts, care should be taken to preserve them for the purpose in covered sheds, and to have them laid on when the weather is inclined to be moist without being too wet.

ASP or ASPEN-TREE. See POPULUS.

ASPALATHUS, a genus containing plants of the ornamental shrubby exotic kind. The African Broom.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters of which are: that the calyx is a one-leafed, five-cleft perianthium: the divisions acuminate, equal, except that the upper part is larger. The corolla is papilionaceous: the banner compressed, ascending, obovate, generally hirsute on the outside, obtuse with a point: wings lunulate, obtuse, spreading, shorter than the banner: keel bifid, conformable with the wings. The stamina consist of ten filaments, united into a sheath gaping longitudinally at top, and ascending. The anthers are oblong. The pistillum is an ovate germ. The style simple and ascending. The stigma sharp. The pericarpium is an ovate awnless legume. The seeds are generally two, and kidney-shaped.

The species are numerous, but few have yet been introduced into cultivation. Those which have are, 1. *A. aliens*, White Aspalathus; 2. *A. Indica*, Indian Aspalathus; 3. *A. argentea*, Silvery Aspalanthus.

The first has the stem shrubby, upright, with a brown bark full of chinks; the extreme twigs somewhat tomentose. The leaves five together, sharp and spreading a little at the tip, of a silky whiteness. The bunches of flowers terminating, silky-white, small, several, glomerate, and peduncled. The calyx is pubescent. No bracte under the calyx, but one under the pedicel. The corolla tomentose and white. It flowers here in July.

The second species is a shrub, with slender hard round twigs; branches alternate, short. The leaves are alternate, leaflets oblong, obtuse, sessile, broader towards the end, bluntish, smooth, the side-ones a little shorter. The peduncles from each of the axils longer than the leaf. The legumes half as long again as the peduncles. It grows about five feet high. The flowers are of a pale red colour; they appear in August, but are seldom succeeded by pods here. It is a native of the East-Indies.

The third rises about four feet high, with a shrubby stalk dividing into slender branches. The flowers are purple, downy, and grow thinly on the branches; they come out late in the summer. The leaves are in threes or in bunches, lanceolate, silky, as is the whole plant. Flowers in spikes, or else scattered, lateral, villose. It flowers in July and August.

Culture.—The propagation in these as well as the other species of this genus may be effected by sowing the seeds, when they can be procured, in the autumnal season, in pots of light earth, and immediately plunged in a very gentle tan hot-bed, being removed into another moderate hot-bed in the spring, for the purpose of bringing the plants forward. They may also be sown in the spring; but in this case they will mostly require to be placed in an old tan-bed in autumn, and to have a fresh hot-bed in the spring, as when sown at the above period they rarely rise the same year. After the plants are become sufficiently strong they should be planted out into small pots, separately filled as above, and plunged into a gentle hot-bed, and when well rooted be gradually accustomed to the influence of the open air, being placed in warm sheltered situations till the period of taking them into the green-house. They should have but very sparing supplies of water during the winter season, as they are apt to be destroyed by it.

ASPARAGUS, a genus containing a valuable plant of the esculent kind.

It belongs to the class and order *Herandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that it has no calyx; the corolla consists of six petals, cohering by the claws, oblong, erected into a tube; three alternately interior, reflex at the end, and permanent; the stamina have six filiform filaments inserted into the petals, erect, shorter than the corolla; the anthers are roundish; the pistillum is a turbinate germ, three-cornered; the style very short; the stigma a prominent point; the pericarpium is a globular berry, umbilicated with a point, three-celled; the seeds are two, round, angular on the inside, and smooth.

The species cultivated is *A. officinalis*, Common Asparagus.

It has a large perennial root, composed of many succulent round bulbs forming a kind of transverse tuber, whence spring numerous stems, which are round, smooth, green, stiff, and branched, in the wild plant a foot and a half high or more, but in the garden plant much higher; branches alternate, thinly subdivided into alternate twigs with a few leaves between them: at their base is a single stipule, which is membranaceous, brownish, triangular-ovate, tapering to a point, the base also running down into a pointed prominence: there is also a stipule at the base of each bundle of leaves, which is cordate-ovate, pointed, ragged at the edge, and often cracking at the sides, its base inclosing the whole bundle. Linnæus mentions two smaller stipules with this. The leaves are three, four, or five in a bundle, of different sizes, linear or bristle-shaped, green with a white point, smooth, four or five lines in length. The peduncles are axillary, pendulous, solitary or two together, one-flowered, sometimes two-flowered; they have a tubercle or joint above the middle, and are protected at the base by the stipule of the twigs. The corolla is yellowish green; the berries red, with the remains of the corolla at the base.

Culture.—In the cultivation of this useful vegetable the plants are invariably raised from seed, which, after three or four years' growth, become in a proper condition for producing full-sized heads of Asparagus; the same roots continuing to afford supplies annually during several weeks in the summer season, as well as during the winter and early spring months, by being forced in pits or frames constructed for the purpose; the shoots remaining after the summer cuttings run up to stems, flower, and produce perfect seed in the autumn.

The soils on which Asparagus may be cultivated to the greatest advantage are those of the

more deep, light, loamy, or alluvial kinds. The very strong loams do not answer so perfectly for the culture of this plant as those of the less heavy sorts.

It is necessary to be particular in the preparation of the ground for the reception of the plants, both on account of the great length of time which is required before they attain perfection, and from little being capable of being done after they have been put in without injuring their roots. It should constantly be well trenched to the depth of two feet or more, and a proper quantity of manure well incorporated with it at the same time. The best manures are probably composts of good horse- or cow-dung with vegetable mould; but some employ sea-weed, marle, and other substances in the same way, especially where the soil is inclined to be stiff.

The most proper situations for this sort of culture are those which are open and well exposed to the free action of the air and sun, as in these cases the Asparagus is not only more early but better flavoured.

Raising the Plants, and Methods of Planting.—The usual mode of providing the plants is by raising them from seed, which should be carefully selected from the best plants, and sown on a bed of good light earth about four feet in width in the latter end of February or beginning of the following month, either in broad-cast over the surface, or in drills at the distance of six inches lengthways, the ground being then raked even. When the plants appear they should be kept perfectly clean from weeds during the summer, and the crowns of the roots protected in the winter by spreading a little short stable litter over them. They are sometimes transplanted so as to form the beds in the spring following; but it is a better practice to let them remain till they are two years old, as the plants are less liable to be destroyed.

Some, however, think it the best method to let the seed be sown at once where the plants are to remain, as by that means they become much stronger at the time of cutting than when they have been transplanted.

In planting, different methods are pursued, as in beds of four feet in width, with alleys of two feet between them; in beds of two feet, with alleys of the same width; and in single rows at three feet or more apart. But though the first is the most common mode, the latter are preferable in many cases.

In the two first methods the roots of the plants should be carefully taken up from the seed-bed, and be made use of without undergoing any trimming. With the four-foot and two-foot beds the plants are usually put in rows at the distance of a

foot from each other, the first having four rows, and the latter two rows lengthways of the beds. They are commonly set in small drills or narrow trenches, but some use a small dibble for the purpose.

In the single-row method it is probably the best practice to drill in the seeds, though the roots may be employed where they are thought preferable.

The beds should be formed of proper dimensions in a neat regular manner by means of a line, and then spaces according to their breadths marked out for the rows, beginning nine inches from the edges. Then stretch a line tight along the length of the bed in the first outside row, and with the spade held in an erect position, the back being placed towards the line, cut out a small trench along close to the line about six inches deep, forming the side next the line upright, turning out the earth evenly to lie close along the edge of the trench, ready to earth in the roots as planted. This being done, proceed to planting the row, placing the plants in the trench close against the upright side about eight or ten inches asunder, with the crowns upright about two inches below the surface, spreading the roots both ways, and drawing a little earth up to those of each plant as they are put in, just so as to fix them in their places till the whole of the row is planted; then directly rake the excavated earth into the trench evenly over the roots and crowns of the plants; which done, move the line a foot further for the next row, and cut out another trench as before, and plant it in the same manner, directly earthing over the plants as in the first row, and so with the rest till the whole is completed. Having finished the planting the beds, the alleys may either be lined out now regularly, or deferred till the winter or spring dressing; though where the beds and alleys are formed previous to the planting, it may be eligible to line them neatly in their proper dimensions as soon as planted, making the edges of the beds full and straight, and the alleys level and even. Some sow the beds with onions, lettuce, or other similar crops; but this should always, if possible, be avoided.

Beds thus planted will continue ten or twelve years or longer.

Asparagus, after being thus planted out, requires the following cultivation: the shoots, as soon as they present themselves above ground in the beginning of May, which are often not much bigger than straws, must be permitted to run wholly to stem, and during summer be kept clean from weeds by small hoeing or hand-weeding three or four times; and where other crops are cultivated with them, thin them in the usual

way, cutting out all such as grow immediately about the Asparagus plants.

In October, when the Asparagus' stalks begin to decay, cut them down and clear off all weeds into the alleys, digging them two feet wide, burying the weeds therein, and spreading some of the earth over the beds, as directed below. This is all that is necessary until March, at which time the beds should be deeply hoed and raked smooth, permitting all the shoots to run up as in the first summer; and in the following October cut down the decayed haulm as before, and land up the beds: in the spring following, which is the second after planting, slightly fork-dig the beds and rake them level.

In this spring, as the shoots sometimes rise of tolerable substance, it is occasionally the practice to gather a few of the largest which first appear; but it is much better to defer this till the third or fourth year.

Landing up and manuring the Beds.—The time to give the Asparagus-beds their winter dressing is from the beginning of October to the latter end of November. This, as mentioned above, consists in cutting down the decayed stalks of the plants and clearing them from weeds, digging the alleys, and spreading some of the earth over the surface of the beds, which is termed landing up the beds. It is performed in the following manner: the stems are cut down close, or within an inch or two of the ground, with a knife; then all the weeds removed with a sharp hoe, drawing them off at the same time to be buried in the alleys; after this proceed to line out the alleys, stretching it along the edges of the beds about nine inches from each outward row of plants, the stakes usually placed at the corners of the beds, or the stumps of the stalks, serving as guides. When this has been done, chop with a spade the ground along by the direction of the line, forming each bed four feet wide, and the alleys two feet. The alleys are then to be dug one spade or more deep, and a good portion of the earth spread over each bed two or three inches thick. As you proceed in digging let the weeds drawn off the beds be trimmed into the bottom of the alleys, and buried a due depth, observing to land the beds all over of a regular thickness, so as to make them about six or eight inches higher than the level of the alleys, forming the edges of each bed full and straight. This work must be repeated every autumn; and before the earth is laid on, it is a good practice to apply a covering of well-rotted stable-dung in an even manner over the whole surface. The drainings of stables and dunghills may likewise be applied with much benefit in the autumnal season: but some only make use of manure once in two or three years

to their Asparagus-beds. But as the plants are of strong growth, the more frequently this is done the better. Instead of landing up the beds in the autumn, it is the practice of the "Scotch Forcing Gardener" to merely free the surfaces of the beds from all sorts of weeds, and stir the mould up to the depth of about three inches with a fork, in order that they may not only derive the fullest advantage from such manures as may be applied, but be more completely acted upon by the atmosphere, as little danger is supposed to be apprehended from the effects of frost on the plants.

Spring-Dressing the Beds.—This operation consists in fork-digging the beds to a moderate depth to loosen the soil, that the buds may freely advance and swell to their full size. The season for performing the work is in March, but not later than the first or second week in April, as many of the buds will then be formed, and in forward seasons begin to advance. The business is mostly performed with a short, flat, three-pronged fork. In the first spring-dressing after planting it is proper only to loosen the surface mould with a hoe two or three inches deep, and rake the beds smooth. But the general spring-dressings should be performed by fork-digging all such beds as have been planted more than one year, three or four inches deep, with the Asparagus-fork, being careful to loosen all the earth as deep as the surface of the roots, having regard, however, not to wound or disturb the crowns of them. After this has been done, the beds should be neatly raked to break the clods, clear off stones, and form a level smooth surface, drawing off all rough earthy or other matters into the alleys, which should afterwards be raked up in a neat order.

It is the custom of the author of the "Scotch Forcing Gardener," when the beds have been covered with manure in a littersy state in the autumn, to remove the coarser parts of it in the spring, pointing in the more reduced parts, and at the same time applying a little fine mould over the rows, being careful not to injure the plants in the operation.

Gathering the Produce.—After the Asparagus plants have attained their perfect growth, the buds from all the plants may be cut over regularly during the season. The proper size of them for use is when they are two or three inches above the surface of the earth, while the heads remain compact and plump. The principal season for cutting is from the latter end of April or beginning of May, according to the earliness of the season, until the middle or latter part of June.

Raising Asparagus by Forcing.—Besides the

method of cultivating *Asparagus* in the natural ground during the spring and summer seasons, it may be raised in winter or the very early spring months by being planted in frames or pits, and forced by means of a hot-bed heat. In order to have constant successions in this way at these periods, fresh beds should be made and planted every month or six weeks, according to the demand.

Raising the Plants.—For this purpose, as in the former, the plants are to be propagated in the open ground, from seed, in the manner already directed, being kept perfectly clean, and suffered to remain without being cut over, till they have attained a sufficiently vigorous growth. In this intention different pieces of ground should be annually sown in the spring, so as to be constantly coming forwards in regular succession for being planted on the hot-beds. But when this cannot be done, the plants may be purchased from the kitchen-gardeners in the vicinity of most large towns.

For this use some employ plants of three or four years growth; but Mr. Nicol thinks that they should not be of less than four years, or of more than seven or eight years growth. And it is advised that they should be kept covered with straw or litter during the winter, in order that they may be readily procured in the time of frost.

The quantity of plants necessary for this purpose is considerable, the space of three rods of ground only furnishing a sufficient proportion of plants for a three-light frame, as they should be planted in a close manner; a bed of this extent not affording more than about three or four hundred large buds weekly, besides *Sprew*, for the period of three weeks or a month at most.

The season for beginning this work should be regulated by the time when the vegetable is wanted for the table. It is frequently begun as early as the latter end of September, but the most usual time is the middle of November; and it may be continued nearly until the period at which the natural *Asparagus* comes in.

Making the Beds.—In the common method of forcing this vegetable the hot-beds are prepared in the usual manner, by throwing together a suitable quantity of fresh horse stable-dung, so as to form beds of about two feet and a half or three feet in height in an upright manner, fine mould or earth being then applied over the surfaces to the thickness of six or eight inches; the outsides of the frames being well lined and banked up with the same materials after the plants are put in, that the heat may be sufficiently preserved, and the plants nearest the sides be preserved from the effects of frost. The beds are sometimes made on the level surface,

or by being slightly raised above it; but where the soil is dry, a trench or excavation six or eight inches in depth may be made for them.

The author of the "*Scotch Forcing Gardener*" recommends that the stable-dung for the beds should be twice shaken over, remaining each time four or five days to sweeten, or let off the rank steam, before the beds are made up. They should then be formed to the height of three feet in front and four in the back, extending a foot further than the frames all round. And after the whole surfaces have been made even they should be covered with turfs, cut so as to form again in an exact manner, being laid the green sides downwards, and smoothed well with the back side of the spade; the frames are then to be placed over, which should have the depth of thirty inches in the backs and twenty in the fronts. In these, good, dry, old tan, that has been well reduced, should be laid in an even manner to the thickness of eight inches or more; or where this cannot be procured, light sandy earth, with a fourth part of good vegetable mould, may be employed. Beds prepared in this way, when they begin to heat, produce less steam than in the ordinary manner; which is the reason of their being turfed. But if any steam arise the frames should be opened to let it off, though it is not of any material disadvantage till the plants appear.

The most suitable situations for forming beds of this sort in, are those which are the least exposed to the west or north winds, and the most open to the influence of the sun. The melon or cucumber grounds answer perfectly well when sufficiently spacious; and it is an advantage if plenty of good mould and earth be at hand for preparing the beds with.

It is, however, suggested by Mr. Nicol, that forcing in flued pits constructed for the purpose is a much preferable and more convenient method; and that the *Asparagus* is of a much better colour and finer flavour than when cultivated on dung hot-beds. And besides, the pits answer various other purposes. The growth of the plants can also be regulated with much greater convenience and exactness, so as to suit the times of their being wanted. It is observed, that a pit twenty-five or thirty feet in length, six in width, and which one fire can command, is sufficient for forcing *Asparagus* so as to supply a large family from November to May in a regular manner, and be afterwards employed in raising various other sorts of crops. The consumption of fuel in these cases is considered as very trifling when the advantage of such contrivances is attended to. Flued pits for this use may be seen in the plate on *beds and pits*.

Stable-dung as well as tan may be made use of in these pits. In practice, three-fourths of the former in the same state of preparation as for ordinary hot-beds has been made use of with success; but it is not so easily managed as the latter, from its heating more violently, and the steam not being so easily let off. Dung ought, therefore, when employed in this way, to be more carefully prepared. A very small degree of bottom heat is required in this culture; of course when such pits have been used in raising pines, the beds will require no additional preparation for *Asparagus*, except that of making them even, and refreshing them with a little old tan on the surfaces. But if melons were the preceding crop, the beds should be stirred up to the depth of two feet, adding some new tan or dung, and then levelling the surface with old rotten tan, as in the former case. In either instance the surfaces of the beds should be made so as to slope towards the sun, and about six inches above the bottoms of the flues, allowing so much for settling. The plants are put in as in other cases. When the flues are of the length mentioned above, one half may be sufficient at a time, the other being prepared in fifteen or twenty days afterwards, in order to keep up a succession. After this, once a month may answer the purpose.

In this mode of culture it is observed, that no fires are necessary when the thermometer stands so high as forty-eight or fifty degrees; but should when necessary be covered with mats in the night, and have air freely admitted in the day when the weather is fine. When fires are requisite they should be employed in a cautious manner; a small one made in the evening may serve for the whole night, and none need be made in the morning, except when the weather is severe: it may, however, be sometimes useful to have one in the morning, in order that air may be admitted freely, and at the same time a due degree of heat be kept up. A higher degree of warmth is, however, to be preserved in this way than in the hot-bed method, which should be regulated by the state of the tan and the healthy aspect of the buds. In beginning with the first end of the pit a second time with roots it is not necessary to stir up the tan, nor perhaps at the third filling; but this should be regulated by watch-sticks thrust into the tan-beds, or the thermometer plunged in them. Fresh materials will not, however, be necessary, as by stirring up the beds to the depth of two feet the purpose will be fully answered for the season. When dung or oak leaves are made use of the beds should be turfed over, and a foot in thickness of rotten tan or light mould laid over

before the plants are put in; but this is unnecessary where tan alone is employed; but not more than an eighth part of new tan should be mixed in.

Planting the Roots.—The beds being prepared in the methods directed above, the roots should be immediately placed in them without waiting for the heat being in a proper state.

In order to this, in the first method, mark out the extent of the frames, and then within that, crossways, raise a small ridge of the surface earth five or six inches in height, against which place a row of roots, which should not be trimmed, pretty close to each other, the crowns upwards, and the roots a little inserted into the mould. A second row is then to be placed in the same way sufficiently near this; and proceed in the same manner till the whole frame is filled. They should then be covered over in an equal manner with fine mould to the depth of an inch or rather more, and when the beds are not formed larger than the frames, earth should be laid up on the outsides against them in the manner already directed.

The beds should remain in this state till the rank heat be gone off, which may be known by trying-sticks thrust in occasionally, being covered at top in severe seasons as occasion may require. It is of much consequence to guard against too much or too little heat at this time. The frames and glasses may then be placed over the beds; and when the buds begin to show themselves they should have an additional covering of fine mould to the thickness of four or five inches, the frames and glasses being replaced over them, the latter being removed either wholly or in a partial manner when the weather is mild, but in the nights they should be covered with mats or dry litter as there may be occasion. The planting in pits is performed in the same manner as in ordinary hot-beds.

General Culture.—In the management of this vegetable in the forcing method, whether in frames or pits, attention is necessary to see that the colour and flavour of the buds be not injured by the rank steam on their first coming through the mould, and that their growth be fully promoted by the due regulation of the heat of the beds, and by a suitable admission of air in mild weather, as well as light and sun. Mr. Nicol remarks, that while the beds have rank heat in them Fahrenheit's thermometer should not stand higher than 50° at any time unless in sunshine, and even then not to exceed 60°.

When the heat of the beds begins to decline, it may sometimes be necessary to have recourse to linings of the same materials as the beds were formed of, in order to raise it. These should be

applied on the sides of the beds in a slanting manner, and be made use of in a partial and cautious manner, frequent recourse being had to the trying-sticks, in order that the heat may not be too great.

During the growth of this vegetable a little water may be sparingly applied, but care should be taken not to have too much.

The buds are in general in a proper state to be cut over in about six weeks from the time of planting, or when they are risen five or six inches in height. The best mode of gathering them is by breaking them off close to the crowns by pushing the finger and thumb down into the earth.

ASPEN-TREE. See POPULUS.

ASPHODELUS, a genus containing plants of the herbaceous perennial and annual flowery kinds, having fleshy fibrous roots. The King's Spear.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters of which are: that it has no calyx: the corolla is one-petalled, six-parted; the divisions lanceolate, flat, and spreading: the nectary consists of six very small valves, converging into a globe, inserted into the base of the corolla: the stamina have six filaments, subulate, inserted into the valves of the nectary, bowed; alternately shorter: the anthers are oblong, incumbent, and rising: the pistillum is a roundish germ, within the nectary: the style subulate, in the same situation with the stamens: stigma truncate: the pericarpium is a globular capsule, fleshy, three-lobed, and three-celled: the seeds several, triangular, and gibbous on one side.

The species are, 1. *A. luteus*, Yellow Asphodel, or King's Spear; 2. *A. ramosus*, Branched Greater White Asphodel, or King's Spear; 3. *A. fistulosus*, Hollow or Onion-leaved Minor Asphodel, or King's Spear.

The roots of the first are composed of many thick, fleshy, yellow tubers, joined into a head at the top; whence arise strong, round, single stalks, near three feet high, covered their whole length with long three-cornered, boat-shaped leaves, of a sea-green colour: the upper part of the stalk is adorned half way with yellow star-shaped flowers, which begin to open at bottom, so that on the same spike there is often a succession of flowers during a full month from the time of its beginning to flower, which is in June, or towards the end of May. It is a native of Sicily.

The second species has likewise roots composed of many thick fleshy fibres, to each of which is fastened an oblong tuber, as large as a

small potatoe; the leaves are long and flexible, having acute edges; they grow in irregular clusters from the crown of the root; among these come out the stalks, which rise more than three feet high, sending out several side branches, which are naked; the upper parts of these are adorned with many star-shaped flowers, which are white with a purple line running longitudinally along the outside of each segment. They grow in long spikes, flowering successively from the bottom upwards. They appear the beginning of June, and the seeds ripen in autumn. It is a native of the south of Europe.

There is a variety, according to Miller, which is unbranched, with white flowers.

The third species is an annual plant. The roots are composed of many fleshy yellow fibres. The leaves are spread out from the crown of the root, close to the ground, in a large cluster; they are convex on their under side, but flat above, and hollow. The flower-stalks rise immediately from the root, and grow about two feet high, dividing upwards into three or four branches, which are adorned with white starry flowers, having purple lines on the outside: these come out in July and August, and their seeds ripen in October, soon after which the plants decay. It is native of the south of France.

Culture.—These are plants that require little trouble in their cultivation, and which succeed in almost any soil or situation. They are capable of being propagated by seeds and by parting the roots.

In the first method the seeds should be sown as soon as they are perfectly ripened in the autumn, upon a bed of light fresh earth in a warm aspect. The plants will rise in the early spring months, and after being kept clean during the summer, may be transplanted into fresh beds in the succeeding autumn or spring, at the distance of six inches from each other, and in the following autumn be planted out in the situations where they are to remain. But it is probably a better practice to remove the plants from the seed-bed into the places where they are to continue, as in this way they grow with more vigour. The third sort can only be raised from seeds, which should be sown in the autumn; and the plants, when they have put out three or four leaves, be removed into the places where they are to grow.

In the latter mode the slips or parted roots may be planted out, either on beds or in the places where they are to grow, in the autumn or early spring. In the former case the plants are usually allowed a summer's growth before they are removed. In either way the tops of the roots should be covered three or four inches

with mould. They usually flower in the following summer.

The first species multiplies rapidly by roots, but the second more sparingly, and does not bear transplanting so well, as it is rendered more weak in its flowering.

The variety with white flowers is less hardy than either of these species.

In severe winters it is useful to protect the roots by the application of tan or stable-dung; and the stems should be annually cleared away when they begin to decay in the autumn.

These plants afford considerable variety, when properly intermixed with others of the flowering hardy kinds in the borders and other parts of pleasure-grounds, producing a good effect from their continuing long in blow.

ASSA-FŒTIDA. See **PERULA.**

ASTER, a genus comprehending different fibrous-rooted flowery plants of the annual and perennial herbaceous and shrubby kinds. The Starworts.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositi Radiati*.

The characters are: that the calyx is common imbricate; the inner scales prominent a little at the end, the lower ones spreading: the corolla compound radiate: corollules hermaphrodite numerous in the disk: the females ligulate, and more than ten in the ray. Proper, of the hermaphrodite, funnel-shaped, with a five-cleft spreading border; of the female ligulate, lanceolate, three-toothed, at length rolling back: the stamina hermaphrodite, five filaments, capillary, and very short: the anther cylindric and tubulous: the pistillum is hermaphrodite: one oblong germ: the style filiform, the length of the stamens: stigma bifid, spreading: females, germ and style the same: stigmas two, oblong, and revolute: no pericarpium: the calyx scarcely changed: the seeds solitary, oblong, and ovate: down capillary: the receptacle is naked and flattish.

The species principally cultivated are, 1. *A. Chinensis*, China Aster, or Chinese Starwort; 2. *A. Tradescanti*, Tradescant's or Virginia Starwort; 3. *A. Amellus*, Amellus, or Italian Starwort; 4. *A. Alpinus*, Alpine or Great Mountain Starwort; 5. *A. Novæ-Angliæ*, New-England Starwort; 6. *A. grandiflorus*, Great Blue Pyramidal Aster, or Cateby's Starwort; 7. *A. paniculatus*, Red-stalked American Starwort; 8. *A. undulatus*, Waved Starwort; 9. *A. linifolius*, Flax-leaved Starwort; 10. *A. tenuifolius*, Fine-leaved Starwort; 11. *A. Ericoides*, Heath-leaved Starwort; 12. *A. dumosus*, Bushy Starwort; 13. *A. concolor*, Single-stalked Starwort; 14. *A. di-*

varicatus, Divaricate Starwort; 15. *A. Nori-Belgii*, New-Holland Starwort; 16. *A. paniculatus*, Panicle Starwort; 17. *A. fruticosus*, Shrubby Starwort. In this numerous genus there are several other species equally deserving the attention of the cultivator.

The first is an elegant annual plant, rising in height from eighteen inches to two feet; the stem is erect, stiff, furrowed, and as thick as the little finger, putting out long bending branches from top to bottom. The leaves next the ground and at the origin of the branches are large, and resemble those of common *Chenopodium*: those on the branches are much smaller, and the upper ones narrow and very entire: the flowers are the largest and handsomest of any of the species in this genus: the disk yellow, at first flat, then convex; the floscules of the ray are broad and long, scarcely notched at the end.

There are varieties of this plant with single white flowers, single blue flowers, single purple flowers, single red flowers; with double white flowers, double blue flowers, double red flowers, and with variegated blue and white flowers.

The second species has radical leaves three or four inches long, like those of the willow, from green inclining to brown, with small scattered serratures. Among these come out round, smooth, woody, brownish stems, clothed with similar leaves, only shorter; they are elegantly divided into many slender, hard branches, two or three feet high, adorned with abundance of very small white flowers during the months of September and October. According to some, the disk is purple. The ray of the corolla is first white, and afterwards purplish. It is a native of Virginia.

The third sort has the stems growing in large clusters from the root, each of them branching at the top into eight or ten peduncles, each terminated by a single large flower, having blue rays, with a yellow disk. It flowers in August or September, and in mild seasons will often continue till the middle of November. It grows naturally in Italy.

There are varieties with white flowers and with wrinkled leaves.

The fourth species seldom rises more than nine, commonly from four to six inches high, in its native situation, and when transplanted into gardens, from nine to ten, but rarely above sixteen. At the top of each stalk is one large blue flower, somewhat like that of the Italian Starwort. It flowers in June, and is a native of the Alps, &c.

There are varieties with white rays and with blue rays.

The fifth species has many stems, five feet



Painted by Syd Edwards

London Published Aug 1865 by G. Kearsey Fleet Street

Engraved by F. Daniell

1 *Aster amellus*
Italian Aster

2 *Amaranthus Hypochondriacus*
Princes Feather

high, brown, terminated by large purple violet flowers, growing in a loose panicle, and expanding in August. The peduncles are so short as scarcely to appear among the flowers. It is a native of New England.

The sixth has many stems, three and even four feet high, stiff, reddish, hairy, and branching pyramidically. The branches have small lanceolate leaves, growing alternate, hairy and rough to the touch, the size of those of common Hyssop, and each terminated by one large blue flower, coming out at the end of October. It is a native of Virginia.

The seventh sort has several strong stems, upwards of two feet high, of a purple colour; but the flowers are on single peduncles, forming a corymb at top, and of a pale blue colour: they appear about the end of September. It is a native of North America; varies in height from eight to three feet, having the stems either dark purple or reddish green.

There is a variety, in which the flowers are purple inclining to red, and surrounded by a few narrow leaves. This is from Philadelphia, and flowers in November.

The eighth species has the leaves broad and heart-shaped at bottom; the stems between two and three feet high, with small side branches, upon which the flowers come out in loose spikes; they are of a pale blue colour, inclining to white. It flowers in August. It is a native of North America.

The ninth has the leaves lanceolate, gradually narrowing to the end: peduncles with very small subulate scales: the stems strong, from two to three feet high, putting out many side branches near half their length, terminated by one blue flower, which appears in August and September.

In the tenth species the stems are five feet high, slender, angular, smooth, but not branching much; the leaves alternate, not very rough; the flowers terminal, solitary, small, and white; the peduncles have very small subulate leaflets scattered over them.

The eleventh has the stems slender, three feet high, with slender side branches most of their length, so as to form a thick bush; they are terminated by single flowers.

The twelfth species has the stems upright, two feet high, full of branches, which are filiform; the stem-leaves being narrow-lanceolate; on the branches linear: the peduncles filiform, striated, one-flowered, with very narrow leaflets on them; the flowers small, with an erect, imbricate, loose calyx; the ray copious, and white; the disk yellow, with fewer flowers.

The thirteenth species rises four feet high; the flowers are pale blue, appearing about Michaelmas. The whole plant is tomentose, especially the

leaves and calyxes. The raceme simple, with very short peduncles. It is a native of Virginia.

The fourteenth has the stems rough, about two feet high, dividing towards the top into many forked branches, diverging from each other. The flowers grow almost in an umbel, and appear the beginning of September. It is a native of Virginia.

The fifteenth species has the stem obscurely furrowed, of a pale red, not very erect, but irregularly flexuose, corymbosely branched, the branches divaricate and much divided; the leaves of the same form, sometimes having a single serrature, the edge scabrous, if the finger be drawn toward the base, the surface rough with invisible hairs; the flowers rather solitary, somewhat small, on long, scaly, yellow peduncles; scales of the calyx distant, in five rows; disk of the corolla yellow; ray pale blue, revolute; the height near four feet, having broad leaves at the bottom, which diminish gradually to the top. The flowers appear at the latter end of August. It is a native of Virginia.

The sixteenth rises to the height of four feet, the stems putting out side branches towards the top, which grow erect, forming a loose spike of large blue flowers, expanding about the end of October. It is a native of North-America.

The seventeenth species has the stems three feet high, with side woody branches having clusters of narrow leaves like those of the Larch-tree; the flowers are produced from the side of the branches, upon long slender peduncles singly; they are of a pale blue colour, and appear the beginning of March. It is a native of the Cape.

Culture.—The hardy kinds of these plants easily succeed in almost any soil or situation. The first sort, and varieties being annual plants, are propagated by sowing the seeds of the different kinds from the beginning of March to May, on a very moderate hot-bed, just to bring up the plants, the air being admitted as much as possible when the weather is suitable, in order to promote the vigorous growth of the plants; when they are sufficiently strong they should be planted out either into beds of good earth at six inches distance each way, or into the places where they are to remain, in the borders or other parts: the latter is probably the better practice, as they grow more strongly. In the bed method they are usually transplanted after a few weeks, with large balls of earth to their roots, into the situations where they are to flower, the mould being made fine about them. A few of the fine double varieties may also be

put in pots. Moist weather is the most suitable for this business, but in other circumstances a little water should be given immediately after the earth has been closed round their roots, as well as in future when it may be necessary.

But when the sowing is not made at an early period, the best practice is to let it be done in the situations where the plants are to grow, which should be rather warm and dry, the mould being made fine by a rake in the spots where they are to be put in, as in this way their growth is less checked than when transplanted.

In either method of sowing, care should be taken that the seed be only covered in a very light manner, and that the mould be made very fine.

The only further culture which they require, is that of keeping the plants perfectly free from weeds, and well supported in the time of flowering.

The whole of the hardy American sorts as well as the Italian species may be readily increased by parting the roots. In the former it is best performed in the autumn, the parted roots being immediately planted out in the places where they are designed to flower.

The latter or Italian sort should have the roots parted and replanted as soon as the flowers begin to decline, as, when the business is deferred till late in the autumn or the spring, the plants neither grow so strong nor flower so completely. The roots in this kind should not be taken up oftener than once in three or four years, where a full display of flowers is the principal object.

This sort has not been so much attended to since the introduction of the American species; but from the plants creeping less by the roots, and requiring less support in the stems, they are equally deserving of regard for the purpose of cultivation.

As this sort is not, however, capable of increasing fast by dividing the roots, it may be readily multiplied by planting cuttings from the young shoots in the later spring months, in situations where the mould is light and fine, being well shaded from the effects of the sun till they are perfectly established in the soil.

The last or shrubby sort must be propagated by setting the cuttings of the young shoots, in pots of light earth, in the spring or summer months, which should be plunged in a hot-bed to promote their striking root. They may then be placed out in the open air during the summer season, but in the autumn and winter they require the protection of a green-house.

The first sort, or *China Asters*, are elegant

plants for the purpose of variety, in the clumps and common borders of gardens, or pleasure grounds. In saving the seeds, they should be selected from the best coloured flowers of the most perfect plants, in October, when they are fully ripened, and be gathered when quite dry.

The perennial sorts have likewise a showy appearance, in large clumps and borders, when judiciously distributed among other hardy shrubs and herbaceous plants; some of the species continuing to flower to a late period in the autumnal season.

The shrubby kind affords variety among other green-house plants, both in the summer and winter season.

ASTRAGALUS, a genus containing plants of the herbaceous biennial, perennial, flowery, and shrubby kinds. The Milk Vetch and Goat's-thorn.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*, or *Leguminosæ*.

The characters of which are: that the calyx is a one-leafed, tubular, five-toothed, acute perianth; lower toothlets gradually less. The corolla is papilionaceous: the banner longer than the other petals, reflex on the sides, emarginate, obtuse, and straight: the wings oblong, shorter than the banner: the keel the length of the wings, and emarginate. The stamina consist of diadelphous filaments, simple and novemfid, almost straight: the anthers are roundish: the pistillum is a germ nearly columnar: the style subulate, and ascending: the stigma obtuse: the pericarpium is a two-celled legume; the cells bent to one side, having a longitudinal bifid septum, parallel to the valves: the seeds are kidney-shaped.

The species cultivated for the purpose of ornament are: 1. *A. alopecuroides*, Fox-tail Milk Vetch; 2. *A. Christianus*, Great Oriental Yellow Milk Vetch; 3. *A. galegiformis*, Great Oriental Rue-leaved Milk Vetch; 4. *A. Tragacantha*, Common Tragacanth Shrub or Goat's Thorn.

The first is biennial, and rises with an upright hairy stem about two feet high, having long pinnate leaves, with eighteen or twenty pairs of ovate leaflets: the flowers are produced in large close obtuse spikes from the axillas; their colour is yellow: the legumes are shut up in the woolly calyxes, and have two cells, containing three or four square seeds in each. It flowers in June or July, and is a native of Siberia.

The second species is perennial, and has the stems rising nearly three feet in height, which are large at bottom, and gradually diminish to the top

the leaves at bottom are likewise very long, and diminish upward, so as to form a sort of pyramid; these are winged, and composed of many large oval pairs of lobes, which are placed thinly on the midrib, and terminated by an odd one: the flowers come out in clusters from the wings of each leaf, beginning near the root where the foot-stalks are the longest, and continuing upwards, diminishing in number. They are large, of a bright yellow colour, and are succeeded by cylindrical pods opening in two cells, filled with square yellow seeds. It flowers in July, and is a native of the Levant.

The third species has a perennial root: the stems are many, upright, more than five feet in height: the leaves have about fourteen pairs of oval leaflets, terminated by an odd one: the peduncles are axillary, on which are small yellow flowers, in loose spikes, extending beyond the leaves. It flowers in June and July, and is a native of Siberia.

The fourth has a large, woody, and branching root: the stems are a foot long, leafy, branching, and hard: the leaves subhirsute, with from seven to ten pairs of leaflets, and no odd one: the bractes large, yellow, ovate-lanceolate: the flowers upright, at the lower part of the stem, on peduncles, from five to eight, shorter than the leaves: the calyx soft and villose, cylindrical, with long capillary teeth: the corollas are long, stiff, and of a pale violet colour: the banner long, plaited, notched, with veins of deep purple: the wings on a capillary peduncle, with a short blunt hook: keel shorter, with short hooks, and a bent pointed purple beak: the legume is one-celled, with four seeds. It is a native of the south of France, &c.

There are varieties with oval lobed leaves; with spear-shaped lobes; with spear-shaped, pointed, downy lobes; with purple flowers; with red flowers, &c.

Besides these species, there are others in this numerous genus that equally deserve cultivation.

Culture.—These plants are mostly of hardy growth, and capable of being raised with facility in almost any soil or situation.

The first three species may be readily propagated by sowing the seeds in the spring months in the places where they are to grow and flower: some, however, raise the perennial kinds in a bed of good earth, afterwards transplanting them into the places where they are to remain; but the first practice is in general the best.

The second species requires a rather warm situation. The plants do not sometimes flower before the third year when produced from seeds, but in suitable soils they continue a great number of years.

The fourth species, as it rarely produces seeds in this climate, is best produced by layers, cuttings and slips, which should be set in pots of light fresh earth in April when the plants begin to shoot, and then plunged into a moderate hot-bed till the plants rise, occasional shade and water being given, when they should be gradually inured to the open air, to render them hardy and prevent their drawing up weakly.

When raised from seeds, they should be sown in pots at the same time as in the other species, being brought forward in moderate hot-beds, and, when the plants are of proper sizes, transplanted into small pots, proper shade and water being given till they are established. They require the protection of a frame or green-house in the winter season; but a few may be planted out in warm dry situations after they have been two or three years in the pots.

Some plants of the first species should be raised annually, as they frequently die after flowering.

In the fifth species the leaves are retained for a considerable length of time, and when they drop off the foot-stalks remain in the form of sharp thorns for the protection of the plants.

The first three kinds afford variety in the borders and other parts of ornamented grounds, and the fourth may be occasionally employed in the same way, in dry warm aspects, as well as in assemblage with other potted plants, during the summer season; but they mostly require protection in winter.

ATAMASCO Lily. See **AMARYLLIS**.

ATHANASIA, a genus comprising various plants, chiefly of the shrubby exotic kind.

It belongs to the class and order *Syngenesia Polygamia Equalis*, ranking in the natural order of compound flowers, in the division *Discoideae*.

Its characters are: that the calyx is common imbricate and ovate: the scales lanceolate and pressed close: the corolla is compound uniform, longer than the calyx; the corollules hermaphrodite, equal, and numerous: proper funnel-form; border five-cleft, acute and erectish: the stamens consist of five capillary short filaments: the anther cylindric and tubular: the pistillum is an oblongish germ: the style filiform, a little longer than the stamen: the stigma bifid and obtuse. It has no pericarpium: the calyx is unchanged: the seeds are solitary and oblong: the down chaffy, consisting of very short bristles: the receptacle is chaffy: the chaffs lanceolate and longer than the seed.

There are many species, but the following may be cultivated: 1. *A. dentata*, Tooth-leaved Athanasia; 2. *A. crithmifolia*, Samphire-leaved Athanasia; 3. *A. antrifurcata*, Trifid

leaved *Athanasia*; 4. *A. pubescens*, Woolly-leaved *Athanasia*.

The first has a low, shrubby, branching stem, seldom rising three feet high. The flowers are pale yellow, appearing early in summer, and, if the season prove favourable, are succeeded by ripe seeds in autumn.

There is a variety, in which the corymbs are compound and terminating, the flowers larger, and the leaves broader at the base.

The second species has the stem shrubby and branching like the following. The leaves are linear, divided more than half their length, some into three, others into five narrow segments. The flowers are like those of the next species in shape and colour, and there is a succession on the same plant for a great part of the summer; but unless the season is warm, they are rarely succeeded by ripe seeds in this climate.

The third has the stem shrubby, five or six feet high, dividing into many irregular branches, with flat glaucous leaves, cut at their extremity into three segments, and having an agreeable odour when bruised. The flowers are of a bright yellow colour, and appear in August, but are seldom succeeded by ripe seeds here.

The fourth species rises with a shrubby stem six or seven feet high: the flowers are yellow: the seeds do not ripen in this climate.

Culture.—These Cape exotics, as they seldom or ever produce seeds in this climate, must be propagated by setting the cuttings during the summer season in pots, which should be plunged into a declining hot-bed, and then closely covered with the glasses, being properly shaded in the heat of the day, and supplied with water. After they have stricken root, and are perfectly established, they should be transplanted singly into pots made up with fresh light earth, being placed in shaded situations till they have become well rooted again; they may then be set out in assemblage with other similar plants in warm situations until it becomes necessary to remove them under the protection of frames or the green-house, where they should have as much fresh air as possible when the weather will permit.

ATRAPHAXIS, a genus comprehending two plants of the shrubby kind.

It belongs to the class and order *Hexandria Digynia*, and ranks in the natural order of *Horaceæ*.

The characters are, that the calyx is a two-leaved perianthium; the leaflets opposite, lanceolate, coloured, and permanent: the corolla has two roundish, sinuate petals, larger than the calyx, and permanent: the stamina consist of six capillary filaments, the length of the calyx: the anthers are roundish: the pistillum is a com-

pressed germ: no style: the stigmas two, capitate: no pericarpium: the calyx closed, including the seed. One seed roundish and compressed.

The species are: 1. *A. spinosa*, Prickly-branched *Atraphaxis*; 2. *A. undulata*, Wave-leaved *Atraphaxis*.

The first is a shrub, which rises four or five feet high, sending out many weak lateral branches, armed with spines, and garnished with small, spear-shaped, smooth leaves, of an ash-colour. The flowers come out at the ends of the shoots in clusters, each consisting of two white petals tinged with purple, included in a two-leaved calyx, of a white herbaceous colour, in August.

The second species sends out many slender branches, trailing on the ground: the leaves are small, and oval, being waved and curled on their edges, embracing the stalk half round at their base, and placed alternate. It is a native of the Cape.

Culture.—As these plants do not ripen their seeds in this climate, they must be propagated by planting cuttings in pots of light earth, in the later spring and early summer months. They require the protection of a green-house during the winter season.

ATRIPLEX, a genus containing plants of the herbaceous, esculent, and shrubby ornamental kinds. The Orache.

It belongs to the class and order *Polygamia Monœcia*, and ranks in the natural order of *Horaceæ*.

The characters are: that in the hemaphrodite flower, the calyx is a five-leaved, concave, permanent perianthium, the divisions ovate, concave, and membranaceous at the edge: there is no corolla: the stamina consist of five subulate filaments, opposite to the leaves of the calyx, and longer than them: the anthers are roundish, and twin: the pistillum is an orbiculate germ: the style two-parted and short: the stigmas reflex: there is no pericarpium: the calyx is closed, pentagon, with the angles compressed and deciduous: there is one orbiculate, depressed seed. In the female flower on the same plant, the calyx is a two-leaved perianthium: the leaflets flat, erect, ovate, acute, large and compressed: there is no corolla: the pistillum is a compressed germ: the style two-parted: stigmas reflex, and acute: there is no pericarpium, but the valves of the calyx are very large, cordate, including the seed between them: there is an orbiculate compressed seed.

The species are: 1. *A. hortensis*, Garden Orache; 2. *A. Halimus*, Tall Shrubby Orache, or Spanish Sea Purslane. 3. *A. tortuolacoides*,

Dwarf Shrubby Orache, or Common Sea Purslane.

The first has an annual root. The stem rises three feet in height and more, and is thick and shining. The leaves are thick, pale green, and glaucous, with few veins, of a slightly acid flavour; they differ in shape; some stretch out into a long point from a broad base, being entire about the edge; some are deltoid; others are serrate or sinuate, and others again are triangular. It is a native of Tartary.

There are several varieties of this plant, as with dark green leaves, with dark purple leaves, and with green leaves and purple borders.

The second species has a perennial woody root, dividing into many branches. The whole shrub is white. The stems from four to six feet high or more, with many thick, woody, brittle branches. The leaves irregularly disposed on the branches on long petioles, thick, succulent, somewhat shining, having a subacid flavour. The flowers are small, purplish, at the ends of the branches. It is a native of Spain, &c.

The third is a low undershrub, seldom rising above two feet and a half, or at most three feet high, but becoming very bushy. The leaves are narrow, and of a whitish colour, but not so white as those of the former. In its wild state it varies in height from six inches to a yard. The branches generally recline, are angular, and of a whitish green colour. The leaves are glaucous, opposite, petioled, generally elliptic, some obtuse, others lanceolate. The flowers are yellow, and terminate the branches in clustered spikes. It is a native of Europe, and flowers in July and August.

Culture.—The culture in the first species is by sowing the seeds in beds or drills in the early spring months, when designed for use in the summer season, and in the autumn, soon after they become ripe, when intended to be made use of in the spring. When the plants are come up a few inches in height, they should be set out to the distance of four or five inches or more by the hoe, and be afterwards kept perfectly clean from weeds. In good soils, with sufficient room, the leaves become large and fleshy, and are made use of while young in the manner of spinach, being preferred by some as having a more mild flavour.

The two last species may be increased by planting cuttings in the spring and summer seasons in shady borders or other situations, being either left to grow up, or in the autumn following transplanted into the places where they are to remain. As the plants do not bear moving well when they become woody, it should be done in their early growth.

These plants have an excellent effect in wilderness and other quarters of ornamented grounds, from the fine silvery whiteness of their leaves, when judiciously blended with other shrubby plants of similar growth. The second species grows rapidly, and sometimes produces flowers.

AVENUE, a large and mostly a straight walk, bounded on the sides by one, two, or more rows of forest- or other trees, designed sometimes as a principal way from the common road to a country house or seat, and often to form views, or to lead to different districts of the neighbouring country. But though avenues, when formed about seats, or detached in parks or other extensive pleasure-grounds, may exhibit an air of grandeur, it is more agreeable to the present taste to have the principal fronts of residences entirely open and unincumbered with these or other kinds of plantations, as it is certainly absurd to hide a good front and obstruct the prospect; an avenue can therefore seldom be admitted with propriety in that part of the ground. But in directions from the wings, detached at considerable distances, avenues may perhaps with propriety be occasionally introduced and extended on the sides of spacious lawns, serving by way of boundaries, being backed next the lawns with shrubs and low trees, disposed irregularly; and if they be carried in an oblique direction, the lawns will widen gradually, and the prospects be more pleasing. Avenues may also be admitted at some distance from either the ends or back fronts of the dwellings, in either of which situations they may be extended towards any common road or village, serving as the ordinary entrance to the habitation, or merely by way of ornament.

Extensive avenues should always be planted with the stateliest trees, an assemblage of the different sorts of which effects the most agreeable variety. The width of the avenue in such cases should seldom be less than sixty feet; and when it is to be extended any considerable length, a hundred feet is not too much; as when the trees grow up the branches on the opposite sides continue to approach each other, which by degrees greatly contract the views; so that, if a considerable width be not at first allowed, the avenues in time appear narrow and confined. The trees in the rows on the sides should be planted at least thirty feet distant from each other, that they may have full scope to display their heads, and each sort exhibit itself conspicuously, according to its natural form and habit.

The sorts of trees most proper for this purpose are those of the deciduous tribe, as the

elm, beech, Spanish chestnut, horse-chestnut, white poplar, sycamore, maple, walnut, wild cherry, &c. all of which being of lofty growth, when disposed in a proper manner, have a fine effect. Sometimes evergreens are used among these: where this is intended, the most proper sorts are the various species of the pine, including all the different varieties of the fir, most of which attain a great height and magnitude, with beautiful spreading heads, that are extremely ornamental and pleasing.

But in forming avenues of the more rural kinds, such as common ways or roads through parks or other pleasure-grounds to habitations, they should be continued either in direct lines or carried round in a moderate sweep, or the course directed in two, three, or more very gentle bends, or easy serpentine turns, each side being ornamented with different sorts of trees thinly dispersed, some singly, others in clumps or groups of two, three, or more together, exhibiting them variously, some breaking forward, others standing more backward; and for still greater diversity, a clump of tall flowering shrubs may be here and there introduced, having the whole so considerably detached as to admit a full prospect of the adjacent lawns, fields, or plantations, in the whole extent.

This is the most modern method of forming and planting avenues; but it cannot be practised with full effect, except where the situation is of considerable extent. For walks and confined situations the row method is mostly to be preferred, as having a better effect.

AUTUMNAL Flowers, such as attain perfection in the autumnal season.

AUTUMNAL Plants, are such as attain perfection in autumn, either in their growth, or their flowering, &c.

AUTUMNAL Season, that from the latter end of August to the end of November, in which various operations in gardening are to be performed, such as sowing, planting, and propagating different kinds of seeds, plants, trees, and shrubs; and the putting in various sorts of esculent plants to stand the winter for the ensuing spring and summer, such as *cabbages, cauliflowers, carrots, lettuce, Spanish onions*, &c. in the more early part; and in the latter *beans, peas, colworts*, and *early cabbage-plants*; likewise *cauliflowers*, some to remain under hand-and-bell-glasses, others in frames, to stand till spring; also *lettuces* on warm borders and in frames, to stand the winter, and *celery* in shallow trenches, for spring use; and for the making and spawning of mushroom-beds, for winter and spring. It is also the proper period to increase different sorts of fibrous-rooted flower-

plants, by dividing or parting their roots, particularly in the months of September, October, and November, when the flower-stems decay, the slipped or divided parts mostly flowering the following year.

And from the middle of September to the middle or latter end of November is the proper time for transplanting from one place to another different kinds of hardy fibrous-rooted perennials, as directed under their proper genera. Most sorts of bulbous flower-roots, that were taken up in summer, are now planted, in order to exhibit an early spring and summer bloom in the following year. The seeds of many sorts of flowers are likewise at this time to be sown, which do not grow so freely when sown at other seasons, as is shown under their proper heads.

In the latter part of this season it is necessary to plant cuttings and make layers, for the propagation of various trees and shrubs of the hardy kind. The seeds of many sorts of hardy trees and shrubs may also be sown. Besides these, many other parts of garden culture are particularly necessary to be executed at this season.

AURANTIUM, Orange Tree. See **CITRUS**.
AURICULA URSI, Auricula, or Bear's-Ear. See **PRIMULA**.

AZALIA, a genus containing plants of the hardy deciduous flowering shrubby kinds. The Upright American Honeysuckle.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters of which are: that the calyx is a five-parted, acute, erect, small, coloured, permanent perianthium: the corolla is monopetalous, bell-shaped, semiquinquefid; the sides of the divisions bent in: the stamina consist of five filiform filaments, inserted into the receptacle and free: the anthers are simple: the pistillum is a roundish germ: the style filiform, the length of the corolla, and permanent: the stigma is obtuse: the pericarpium is a roundish capsule, five-celled and five-valved: the seeds many and roundish.

The species chiefly cultivated are: 1. *A. nudi-flora*, Naked-flowered Azalia; 2. *A. viscosa*, Viscid-flowered Azalia.

The first in its native situation often rises to the height of fifteen feet, but is here never more than half that height. It sends out several stems from the root. The leaves are oblong, smooth, alternate and petiolcd. The peduncles are axillary, long and naked, supporting a cluster of red flowers, which are tubulous, swelling at their base like those of the hyacinth, and contracted at their neck; they are divided at the top into five equal segments, which spread open.

A Z A

The five stamens and style are much longer than the petals, and stand erect. It is a native of Virginia.

There are varieties of this plant with scarlet flowers; with pale red flowers; with curly white flowers; with red and white flowers; and with variegated flowers.

The second is a low shrub, rising with several slender stems near four feet high; the leaves come out in clusters at the ends of the shoots without order: they are spear-shaped, and narrow at their base; their edges are set with very short teeth, which are rough; the flowers come forth in clusters between the leaves at the extremities of the branches; they are white, with a mixture of dirty yellow on the outside: the tube is an inch long, and at the top they are pretty deeply cut into five segments; the two upper are reflex, the two side ones bent inward, and the lower one is turned downward; the stamens are a little longer than the petals, and support oblong saffron-coloured anthers. The style is much longer than the stamens, and is crowned by an obtuse stigma. These flowers have much the appearance of those of Honey-suckle, and are as agreeably scented; more so

A Z A

than the foregoing sort. They appear the middle of July, but are not succeeded by seeds in this climate. It is a native of North America.

This plant has varieties, with white striped flowers; with narrow petalled flowers; and with clustered flowers.

Culture.—These plants may be raised without much difficulty, in rather moist soils where the situation is shady. As they never produce seeds in this climate, they must be increased by layers from the young shoots, or by offsets from the roots. The best season for either of these methods is the early part of the autumn, when they should be set out where they are to grow, or be planted in rows in the nursery manner. It is useful to protect the roots during the winter, by covering the ground about them with old tan, or other similar substances.

Where the seeds can be procured, plants may be raised by sowing them either in pots or on warm borders; in the former method, forcing their growth by plunging them in mild hot-beds.

These shrubby plants are suited for affording variety in shrubberies and other places, both on account of their fragrant smell and the beauty of their flowers.

B A C

BACCHARIS, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ*.

The characters are: that the calyx is common cylindric, imbricate: scales linear, acute: the corolla is compound equal; corollules hermaphrodite and female mixed. Proper, to the hermaphrodite funnelform, five-cleft, to the females scarcely apparent, almost none: the stamina consist of five capillary filaments, very small: the anthers are cylindric and tubular: the pistillum is an ovate germ: the style filiform, the length of the flower: the stigma bifid. There is no pericarpium: the calyx unchanged: the seeds solitary, very short and oblong: down simple: the receptacle naked.

The species chiefly cultivated in the garden are; 1. *B. iuvifolia*, Peruvian Ivy-leaved Baccharis, or Ploughman's Spikenard; 2. *B. nerifolia*, Oleander-leaved Baccharis; 3. *B. halimifolia*, Sea Purslane-leaved Baccharis, or Groundsel-tree.

The first grows to the height of five or six

B A C

feet: the female florets with a trifid corolla are very abundant; but the hermaphrodites of the disk are few and five-cleft: the scales of the calyx spread very much in a state of maturity: the florets of the disk are barren; of the ray subulate, scarcely toothed, and fertile: the receptacle obtusely conical, alveolate at top, the cells toothleted, but at the sides simply and obscurely scrobiculate: the seeds are small, ovate-oblong, flattened a little, obscurely margined and pale: the pappus or down sparing, twice as long as the seed, scarcely toothed. It is a native of America, and flowers in July and August.

The second species has a soft shrubby stalk, which rises to the height of eight or ten feet, putting out side branches toward the top: the leaves are stiff, having a few indentures toward their top, and placed without order: the flowers are produced at the extremities of the branches in a close spike: they make little appearance, being of an herbaceous colour, and are not succeeded by seeds in this climate.

The third is a herbaceous kind of shrub, six, seven or eight feet in height: the leaves are

many, like those of Goosefoot, but stiffer, irregularly set on the branches. Flowers crowded, naked, at the end of the twigs: they are not very beautiful, but the leaves continue green through the year. It is a native of Virginia, and flowers in October.

Culture.—The first species is capable of being increased, either by cuttings or the seeds: the first should be planted out in shady borders, or in pots in the summer months, and care taken to give water frequently in dry weather, till they be well rooted: the seeds may be sown in borders that are not too much exposed to the sun, or in pots in the early spring season.

As the second sort is not easily increased by cuttings, and seldom sends out shoots from the root to be laid down, the whole head of the plant is sometimes laid down into the ground, being confined there, and the small branches slit as in the culture of carnations: they should be frequently watered, and after they have had a twelvemonth's growth, may be separated and planted out in pots of light earth, being placed in a shady situation till they become well rooted, when they should be managed as other green-house plants.

The third species may be readily raised by cuttings, which should be planted out in a shady bed or in pots, in the spring season, being well watered in dry weather. The young plants may be removed in the autumn, into pots or other places where they are to grow.

The first and third species are somewhat hardy: but the second requires the protection of a green-house in the winter. Some of the other sorts should likewise be cultivated in pots and protected in winter, as they are apt to be destroyed by frost in severe seasons.

These two sorts are often planted in shrubbery and other quarters of pleasure grounds.

BALM. See **MELISSA**.

BANISTERIA, a genus comprising different plants of the tender exotic kind.

It belongs to the class and order *Decandria Trigynia*, and ranks in the natural order of *Trichilata*.

The characters are: that the calyx is a four- or five-parted perianthium, very small, stiff underneath with tubercles, permanent. There are two melliferous glands under each division of the calyx, except one: they are therefore eight in number: the corolla has five petals, orbiculate, very large, spreading, crenate; claws oblong and linear: they consist of ten filaments, very small, coalescent at bottom: the anthers are simple: the pistillum three-winged, coalescent germs: the styles three, simple: the stigmas are obtuse: the pericarpium consists of

three capsules, running out into a long wing, one-celled, marked at the sides with small appendices, not gaping: the seeds are solitary, covered, and toothed on the lateral edge.

The species principally cultivated in the stove are; 1. *B. angulosa*, Angled Banisteria; 2. *B. purpurea*, Purple Banisteria; 3. *B. laurifolia*, Bay-leaved Banisteria; 4. *B. bracteata*, Cross-armed Banisteria; 5. *B. fulgens*, Flame-coloured Banisteria.

The first has a twining stem, with opposite branches, thickened at the base: the leaves are cordate, angular, the breadth equal to the length, ending at top in a short dagger point, green above, whitish beneath, nearly equal to the petioles, on which and near the leaf are two opposite glands. There are no stipules: the flowers are in opposite axillary umbels: common peduncle elongated; the rays five to seven, an inch long, jointed, having two short opposite bractes. At the insertion of the rays are two small suborbiculate leaves: the corolla is sulphur-coloured. It is a native of the island of Dominique.

The second species has the stems strong and woody, dividing into many branches, which are opposite and twining. It ramps with these over the hedges: the leaves are ovate, sometimes round, an inch long, on short petioles, and making the branch as it were pinnate. There are five or six pairs of these, nearly of the same size with those of the common *Acacia*, but whitish on their under side: the flowers are axillary, in a kind of spike; with the partial peduncles opposite, jointed, and having a pair of very short bractes: the petals are purplish and short. It is a native of the Caribbee islands.

The third sort has the stem shrubby, climbing, with loose, reflex, diverging, roundish, rugged branches: the leaves are petioled, ovate-lanceolate, acute, entire, coriaceous-membranaceous, nerved, smooth: the racemes panicle; terminating branches and twigs decussate, ferruginous-tomentose; peduncles commonly one-flowered, ferruginous, short and yellow: the leaflets at the base of the peduncles two, opposite, minate, and tomentose: the calyx is five-leaved; leaflets ovate-lanceolate, acuminate, with two round, depressed, green glands fastened to the base: the petals are spatulate: anthers elliptic: the germ three-coloured and trifid at the tip: the styles are subulate and short: stigmas dilated, and as it were halved. One of the three capsules is usually abortive: wings three or four times longer than the capsules. It is a native of Jamaica.

The fourth species has much the appearance of the following, but the leaves are more blunt: the

upper branches bear flowers, and are paniced : the inner margin of the winged seed is sharp, the outer blunt : it has no toothlet besides the lateral ones at the base. It sends out many branches, which are subdivided into others, growing without order, and becoming bushy upwards, sending forth tendrils by which they fasten themselves to the neighbouring trees, and climb to a great height. It is garnished with oval stiff leaves, ending in a point. The flowers are produced in tall spikes at the end of the branches, which are first of a gold colour, then fading to scarlet : they are succeeded by slender thin seeds, mostly single. It is a native of Carthage.

The fifth has slender winding stalks, which rise five or six feet in height : the flowers grow in a round bunch at the extremity of the branches, and are of a brownish yellow colour : the seeds are smaller, and have narrower wings than in the third species : the leaves are ovate with a point, villose beneath, shining and smooth on the upper surface. A solitary branch comes forth from the axils, furnished with leaves, producing at top, in a kind of umbel, several filiform, simple, one-flowered peduncles : the seeds are erect, the outer angle decreasing to an edge, the inner more blunt, putting forth a small sharp membranaceous angle next the pistil : by the seeds on each side next the base, are three small appressed toothlets.

Culture.—These plants may be raised by sowing the perfectly ripened seeds, procured from abroad, as soon as they are obtained, in pots of light sandy mould, which in the autumn and winter season should be plunged in moderate tan hot-beds, carefully preserving them from frost and too much moisture till the spring, when they should be removed to a fresh very mild hot-bed just to bring up the plants : when they have obtained a little growth, they should be placed in separate pots of the same sort of earth, and plunged in the bark-bed. If the plants do not appear the first year, the pots should be left till the following, as the seeds are often slow in vegetating. The after culture is the same as that of other tender stove plants of similar growth. They are only cultivated for variety in the stove.

BARBERRY. See **BERBERIS**.

BARK, TANNERS, the astringent cortical substance peeled from oak and some other trees ; which, after being ground and made use of in tan-vats, constitutes a material of great utility in forming hot-beds where a regular heat is required for some length of time, as in stoves, pits, &c. for the culture of various plants of the tender exotic kind.—See **HOT-BED**.

BARK-BED, that sort of hot-bed which is either wholly or principally formed of tanner's bark. Beds of this kind, from their preserving the most uniform and regular degrees of heat, are found by much the most useful in the propagation and culture of all kinds of tender exotic plants that are brought from warm climates, and which stand in need of the continued assistance of artificial heat in this part of the world. Beds of this nature, with a little trouble in the management of them, are found sometimes to support a pretty uniform and regular temperature for a considerable length of time.

These are the kind of hot-beds that are generally employed in hot-houses, being formed in pits or cavities, constructed for the purpose in them, frequently the whole length of the houses ; six or seven feet in width, and three in depth, being inclosed by means of brick-work.—See **BARK-PIT**.

In these beds the pots of such tender exotics as have been mentioned are plunged and supported ; and they at the same time afford assistance in supplying such houses or stoves with those degrees of heat that may be proper for the growth and support of various other plants that do not require to be plunged into the beds, the heat of the surrounding air, produced in this way, being sufficient for their growth and preservation. Thus, by the aid of bark heat, and that of fire during the severity of the winter season, the gardener is enabled to imitate, within the hot-house, the temperature of distant climates, and not only to cultivate and bring to perfection the pine-apple, but also various other tender plants from different quarters of the globe, both of the herbaceous and woody kinds, and to exhibit them in their most healthy and beautiful states of growth in this country.

Bark hot-beds are likewise occasionally formed in pits constructed for them, in the open ground, separately, and detached from hot-houses. These are walled round with bricks, chiefly above the surface of the ground, having a frame or coping of wood upon the top, on which glass lights are fixed, so as to slide with facility.—See **BARK-PIT**.

In these pits the bark-beds are made to the depth of three feet or more, in order to afford an uniform and lasting heat, for the purpose of raising and propagating different sorts of tender plants from seeds, suckers, layers, cuttings, &c. both of the stove and green-house kinds, as well as those of the natural ground. Such beds are of course of great utility where there are large collections of tender exotic plants, and as nursery-pits for young pine-apple plants

to supply the stove or pinery annually. See *Stove*.

Beds formed of bark are also employed with success in raising various sorts of early productions of other kinds, as early strawberries, melons, peas, French beans, &c., which, by the regular and moderate heat which they afford, are mostly brought forward in the greatest perfection. They are likewise made use of in forcing different sorts of curious flowers, both of the bulbous, tuberous, and fibrous-rooted kinds, into early blow; as hyacinths, dwarf tulips, narcissuses, jonquils, anemones, ranunculuses, pinks, &c.; also many plants of the small shrubby kinds, as roses, hypericums, &c.

Bark-beds are also employed with great advantage in forcing-frames, for the purpose of producing early fruit of the apricot, peach, and grape kinds. See *FORCING-FRAMES*, and *HOT-WALLS*.

Hot-beds constituted of bark, from the slow and regular manner in which the heat is in common evolved, are not so liable as those of dung to injure the plants by their steam: they are therefore to be preferred for all the more important purposes of forcing, where the material can be obtained.

The heat of them may be perpetuated for a great length of time, by having recourse occasionally to the practice of forking or turning them over, adding in such operations about a third part of new tan or bark. The beds are however to be wholly, or in a great part, renovated every autumn or spring.

There are different sorts or sizes of bark made use of for the construction of these beds, as coarse, middling, and small. The first kind is the longest in taking on heat, and is apt to heat violently at the beginning, but is of the longest duration. The second sort heats sooner, is more regular, and pretty durable in its effects. But the last kind heats the quickest, yet it is the weakest, and soonest becomes earthy; consequently the least proper for the purpose. Where there is a choice of the material, the middle sort, or a mixture of it and the coarse, should constantly be preferred, admitting as little of the small as possible. And care should be taken that it be perfectly fresh from the vat of the tanner. When the bark is wet after being brought home, it is a good practice to throw it up into heaps or ridges for a few days, in order that it may be drained and rendered more dry, as without such precaution the process of fermentation may be too much retarded.

The periods of making beds of this nature must be regulated by circumstances; but where they are intended for pine-apple plants, they

should be prepared about the latter end of September or beginning of October, in order that they may afford a good heat during the winter season; but when the raising of plants from seeds, cuttings, &c., or the forcing of culinary vegetables and fruits, or flowers, are the principal objects, the latter part of winter, or the early spring season, may be the most suitable times, as in January, March, or the following month. For particular uses they may however be made at any period. For the methods of forming and managing them, see *HOT-BED*.

BARK-PIT, a pit or cavity of a long, square, or other form, made to the depth of three or four feet or more, in the hot-house, stove, or other situation, in which to make tan or bark hot-beds. The width may be four, five, or six feet or more, having length in proportion to that of the hot-house, &c. When made in a detached manner they may be of such sizes as are requisite for the particular purpose in view. They are formed by a low surrounding brick wall, about three feet in height, in such pits as are in the houses, and in the others three or four feet in front, by four or five in the back.

Pits of these different sorts are indispensably necessary, where bark-beds are to be made, as the loose nature of tan will not admit of being formed into compact regular beds, without the aid of such kinds of enclosures to confine it in.

Bark-pits are necessary for various purposes in hot-houses and stoves, as well as occasionally in forcing-houses, &c. And bark-pits distinct from hot-houses are likewise useful in extensive gardens on many occasions, being of great advantage in the culture of many sorts of tender exotics, and in rearing various kinds under different methods of propagation, as well as for raising and nursing those of similar kinds in their young and tender growth. They are also useful for forcing and raising early productions of several sorts of hardy plants in the greatest perfection.

Pits of this kind mostly extend lengthways, and occupy nearly the whole bottom space of the houses, only about two feet on each side and at the ends being left for a walk round between the outward walls and those of the pits, which should be but very little sunk below the general surface of the floor of the surrounding path; the bottom or floor being paved with brick, stone, or some similar material, and the tops of the walls of the pits well coped with wood or stone. The bark-beds are made to the whole width, length, and depth of these pits, and serve to plunge the pots of the more tender exotic plants in, such as the pine-apple, &c., in order that they may have the benefit of a kindly moist heat

immediately about their roots; and at the same time the advantage of a warm vapour for heating the internal air, assisted by fire-heat in the flues in the winter season, but which in summer and autumn is sufficient alone; producing, from the beginning of spring till October, an effectual temperature of internal heat, for the preservation and growth of almost all such tender exotic plants as are natives of different parts of the hot regions of South America, Asia, and Africa.

Hot-houses or stoves of the common width have in general only one pit extending lengthways of them, as described above; but if they are of considerable extent in length, the pits are sometimes divided in the middle, or at other parts, by intervening passages, to render them more convenient in performing the necessary culture of the plants. Some hot-houses of very great width have likewise two bark-pits ranging parallel lengthways with a passage extending between them, which renders them more commodious in giving the requisite culture to the plants that are plunged in the beds, than if the whole was in one extremely wide pit, in which it would often be very inconvenient to come at the plants placed towards the middle; and by having an intervening passage, give a larger scope, and afford a better current of air for the growth of the plants in the beds, as well as admit of viewing them to much greater advantage and effect.

Detached or external bark-pits are such erections as are formed separate and distinct from hot-houses or stoves, but in some manner connected with them, being employed for similar uses, as well as for various other purposes where occasional artificial heat is wanted. They are made, as has been just observed, four, five, or six feet wide, having such lengths as may be required, formed by surrounding walls of brick-work, three or four feet in height in the fronts, by four, five, or six behind, where sometimes flues for winter fire-heat are erected in the upper parts, the whole being coped and covered at top with moveable glass frames sloping southwards to the full sun, and in which a bark-bed being made to the whole width, length, and depth, becomes an useful appendage to the stove, greatly assisting in the culture of various tender exotics of that repository, especially in the way of nursery-pits for raising and preserving them to some advanced state of growth; also occasionally in the propagation and protection of the more tender kinds of green-house plants, or any particular curious or tender plant of the full ground, as being always ready, and prepared with a continuing growing heat, in which to

plunge the pots, where artificial heat is required, or essentially necessary in raising such tender plants more effectually and expeditiously. These kinds of bark-pits also prove exceedingly useful in raising many sorts of tender exotics from seeds, suckers, cuttings, slips, &c., and in retaining and forwarding them in their growth for some time. Bark-pits of this kind are likewise, as has been seen, particularly useful and necessary in the culture of young pine-apple plants; for rearing and nursing them till of a proper age and size to be placed in the succession-house, fruiting-stove, or pinery. Similar kinds of detached bark-pits are likewise occasionally used with advantage in planting, transplanting, and shifting tender or curious plants in pots; for plunging the pots which contain them in as soon as replanted, which much expedites their taking fresh root, and brings them up at first into a free and vigorous growth. Bark-pits of the same kind are also successfully employed in forcing and raising early productions, such as melons, kidney-beans, peas, strawberries, &c.; and for many sorts of flowers, both of the bulbous-rooted and herbaceous kinds, as well as for small flowering shrubs. And if the dimension of them be sufficiently increased, especially in height in the back parts, they may be made use of for several sorts of dwarf fruit-trees in pots, in order to the production of early fruit. Detached bark-pits should always be erected in warm dry situations, in a southerly aspect, and be constantly ranged lengthways in the direction of east and west, or nearly so, in order to have the whole fronts incline fully to the south sun, in a sloping manner, on which to place the glasses in the same position, being placed either contiguous to the hot-houses or stoves, but at a proper distance in front of them, as the situation or convenience of the place may admit, or at one or both ends, extending in a line with them, but separated by a passage between them. But detached bark-pits are sometimes formed with ridged tops, like the roofs of houses, the glasses sloping to both sides, being ranged lengthways north and south, in order to have the benefit of the sun equally on both sides, and used for the same purposes as the others; though the common south-fronting pits are more generally employed, as being less expensive in glass, and in common more convenient for purposes of the forcing kind. They should be constructed, as has been observed, with brick walls, on the sides and ends nine inches thick; and where fire-flues are intended, the back walls should be of a proper thickness from the bottom, to admit of having them in the upper parts, a fire-place being contrived externally at the bottom at one

end; or in considerably extended pits, a double fire-place may be formed in the middle, behind, or at each end, as most convenient.

Detached pits are sometimes formed of wood only, by means of posts and planking, serving for particular purposes where no fire-heat is required. In such kinds of pits, where additional heat is occasionally necessary, it is effected by applying a strong lining of hot dung to the outside, by which a good constant heat may be supported. In these bark-pits sometimes the younger pine-apple plants are deposited and nursed for the first year: they may likewise be occasionally used for the purposes of propagating, raising, and nursing tender plants and flowers in spring and summer, as well as for forcing early esculent crops. The principal detached bark-pits should, however, always be formed with brick walls, as being the most effectual for general use, and of the greatest duration. See HOT-BEDS.

At figs. 1, 2, 3, and 4, in the plate on bark-pits, are seen the most improved forms and constructions of these sorts of pits.

BARK-BOUND, a supposed vegetable disease in fruit- and other trees. It probably depends upon the imperfect growth of the plants. The general mode of removing it has been by making incisions through the bark in a longitudinal direction from the top of the tree or bough to the bottom, in the very early spring season, the gaping, when considerable, being filled up with some composition of an adhesive nature. Caution should however be employed in making such incisions, and more attention be had to the state of the roots, as injury instead of advantage may sometimes be produced by such means.

BARK-GALLED, an affection produced in the bark of trees and plants, by their rubbing against other plants, or the stakes to which they are tied for support. It may be removed by binding some adhesive soft material on the part by hay ropes. In binding trees to supports, care should always be had to introduce a portion of the rope between the tree and the support to which it is to be fastened.

BARLERIA, a genus comprehending different plants of the tender perennial exotic kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a four-parted permanent perianthium; two opposite leaflets larger: the corolla is monopetalous, funnel-form, quinquelid, subequal: the fifth division deeper: the stamina consist of four filiform filaments; two very short and capillary:

the anthers, the upper oblong, the lower withered: the pistillum is an ovate germ: the style filiform, the length of the stamens: the stigma bilobed: the pericarpium is an acute, flat-quadrangular, two-celled, two-valved capsule, gaping elastically at the claws: the partition contrary: the seeds two, compressed, and roundish.

The species principally cultivated in the stove are: 1. *B. solanifolia*, Solanum-leaved Barleria; 2. *B. prionitis*, Prionite Barleria; 3. *B. luxifolia*, Box-leaved Barleria; 4. *B. coccinea*, Scarlet Barleria.

The first has the stem bluntly quadrangular, erect, and hispid. The leaves are opposite, lanceolate-sword-shaped, quite entire, thrice the length of the internodes. The flowers are in whorls and axillary. The spines of the stem are three on each side, the length of the whorls. It is a native of the East Indies.

The second species has the stem herbaceous, round, and stiff. The leaves are opposite, running down the petioles, and pubescent underneath: between the branch and the leaf is a spine with four sharp rays from the same centre. The flowers sessile in the axils. The calyxes acuminate-spiny. Two of the four stamens very small at the bottom of the corolla, with little anthers. The capsule has a longish solid point, and bursts without internal elastic points. It is a native of the East Indies.

The third has shrubby stalks, five or six feet high, with strong spines under the leaves. The flowers are produced in whorls towards the upper part of the stalk; these are succeeded by short seed-vessels containing three or four flat seeds. It is a native of Jamaica, &c.

The fourth has the stems smooth, and four feet high. The flowers are scarlet, in whorls at the joints, appearing from July to September, and succeeded by short pods inclosing flat seeds. It is a native of South America.

Culture.—These plants may be increased by seeds, layers, and cuttings, according to the kinds. In the first, third, and fourth species, the seeds should be sown in pots filled with light fresh earth, in the spring; and in the autumn, when the plants are sufficiently strong, they should be removed into separate pots; which must be plunged into a moderate bark-hot-bed, in which they must be constantly retained. When they produce seeds, they frequently sow themselves in the pots which are near them.

The second sort, as well as the others, may likewise be raised by laying down the young shoots in pots during the early summer months, proper shade and moisture being given until they have stricken fresh root. In the following autumn they will be ready to be transplanted out

into separate pots, to be placed in the bark-pit of the stove. When cuttings are employed in the second sort, they should be taken off the young shoots at the above period, and made into lengths of five or six inches, being then planted in pots of light earth, and immediately plunged in a moderate hot-bed, being removed in the autumn to the tan-bed in the stove.

They all require a free admission of fresh air when the weather is fine, and in the summer season frequent watering will be necessary.

These plants afford variety in the green-house and stove, and some of them are so hardy as to stand the open air in warm situations.

BASKET, Garden-, a contrivance formed of small osier twigs or shoots interwoven with each other, made for the purpose of receiving various sorts of garden vegetables and fruits. They should be of different kinds and sizes, in order to answer different intentions, and capable of containing quantities from a quarter of a peck gradually up to a bushel or more.

And in order to suit different uses they should be of different forms and shapes; some smaller sorts made flat and shallow, of different sizes, both with and without handles; others of the smaller kinds deeper, either with rounding or flat bottoms; some with a small cross handle, others without; and larger kinds still wider and deeper.

Such as are intended for gathering many kinds of smaller articles, as the several sorts of salad-herbs, soup-herbs, and other similar productions, that are required only in small or moderate quantities at a time, should be had in regular sets of different sizes; of the smaller sorts, as round shallow chip or osier, of from about eight or ten to fifteen or eighteen inches width, by two or three to five or six inches in depth, or a little more; and the first kinds may either be in common without handles, or those of the larger and deeper sizes may have low cross handles, as is most convenient.

But for gathering the larger productions of the principal crops, as cabbages, cauliflowers, celeris, and other similar kinds; and the different sorts of large esculent roots, as peas, beans, &c., which are usually required in considerable quantities, they should be large strong osier baskets, of much wider and deeper dimensions, and of different sizes, to hold from the quantity of a peck to a bushel, made in proper forms, with suitable handles according to their uses.

Some of those called sieve baskets may also be convenient on many occasions: they are mostly made of a low form, being equally wide at the bottom and the top, and from ten or twelve to fifteen or eighteen inches over, by eight or ten

to twelve inches deep, but without handles. These are well adapted for gathering and sending the larger quantities of particular sorts of fruits, such as cherries, gooseberries, currants, grapes, plums, pears, &c. to market, or occasionally, with the smaller sorts, for peaches, nectarines, apricots, and other kinds of the finer sorts of fruits, each different kind being mostly put in a separate basket.

When it is intended to send these sorts of fruit to any distance, they should not be filled above the brim, and be covered at top, either with leaves, fern, or a little clean hay; and thus, when conveyed many together, those of equal size may, if necessary, be placed one upon another, without fear of their pressing detrimentally upon the fruit; as in this manner vast numbers of baskets are often sent, packed together, by boats and other conveyances to the London markets.

And for sending some of these more delicate sorts of wall-fruit, as peaches, nectarines, fine plums, &c. they are put up in similar-formed but smaller baskets, as in those of three, four, or five inches deep, without handles; and these packed together in one of large deep dimensions.

For family use, to send considerable portions of different sorts of kitchen-garden productions, fruits, &c. to any distance, one or more large, wide, deep, osier basket is necessary, made round or oblong, or in the manner of a hamper, and furnished with a top cover, fixed to one side, with a sort of withy hinge.

Baskets of this larger kind are likewise exceedingly useful for various other purposes in gardens, in containing and carrying particular articles; as in the business of planting and transplanting, to contain and carry the respective sorts of plants, roots, sets, &c. to the places where they are wanted. Similar kinds of baskets are also very useful in the business of hand-weeding in walks, beds, borders, &c. to contain and carry off the weeds, as well as for removing heaps of weeds, litter, and rubbish, where a wheel-barrow cannot be conveniently admitted or employed for the purpose.

For gathering and containing different sorts of fruit, different-sized baskets are also necessary.

Where there are collections of different fruits, the baskets should be of proper sizes, adapted for smaller and larger kinds; as for gathering the daily supplies of the several sorts of smaller fruits, as cherries, strawberries, raspberries, mulberries, gooseberries, currants, grapes, &c. regular sets, in several sizes, of small round white chip, or neat osier, may be proper; those from six or eight to ten or twelve inches wide, and from three or four to five or six inches

deep, being more eligible than larger, in which occasionally may be gathered some of the above different sorts in separate baskets, and these placed together in a larger wide flat basket to carry them for the table, &c. and for larger kinds of choice fruit, as apricots, peaches, nectarines, plums, figs, pears, &c. a similar set of small baskets would also be very convenient to gather the fruits in to the best advantage; or sometimes to gather some particular sorts in separate smaller baskets, as being not so liable to bruise as when too many are placed together in baskets of larger sizes.

A small sort of narrow, upright, chip basket, called pottle, is useful for conveying some smaller sorts of ripe fruit in, &c., and for which purpose they are much used in the gardens in many places; as for strawberries, raspberries, mulberries, and sometimes for early cherries, gooseberries, currants, and choicer sorts of early plums, &c. as the fruit is not so liable to bruise, as when placed together in great quantities in large baskets.

When fruit is intended to be sent to a distance, or for market, in large quantities, in these small baskets, they are packed together, upright, in a large, wide, flat, osier basket, and in that manner often carried upon the head, as not being so liable to bruise as by other methods of conveyance.

Flag hand baskets are likewise useful in gardens in gathering particular sorts of vegetable productions, as well as the hardier sorts of fruit, and for sending small portions of different sorts to a moderate distance. These baskets are also useful in gathering some sorts of hardy fruit by hand, on high standard trees, such as apples, pears, &c. and green walnuts for pickling, &c.

And sometimes in removing for transplantation some curious sorts of largish ever greens, &c. into the full ground, with balls of earth about their roots, to be sent to a distance with them as entire as possible, that the plants may scarcely feel any check, large, strong, coarse, willow baskets, not very closely worked, are useful to place the plants in separately.

Baskets for the use of the market-gardeners are of several sorts and sizes, peculiar to themselves, for gathering and carrying their productions into market, for which they have different terms, as *maunds*, *junks*, *sieves*, *boat-baskets*, *bushel-baskets*, and *large-baskets*.

Most of the different sorts of baskets for garden uses may be procured of the basket-makers.

BASON, an excavation made for the purpose of containing water, either for use or ornament, in gardens or pleasure-grounds.

Basons of this sort are often necessary and con-

venient in gardens for watering plants in summer, particularly such as are obliged to be planted out in time of drought, as well as beds of young seedlings, of any sort, in dry seasons; and plants in hot-beds under glasses; also all sorts of plants in pots; as the water exposed to the influence of the sun and air in these ponds is considerably more salutary to the growth of vegetables, than such as is drawn immediately out of wells.

Where basons for containing water are formed for ornament in pleasure-grounds, they should be introduced in some of the more conspicuous situations, especially in the lower parts, and where a proper supply of water can be most readily obtained, either naturally, or by being conducted from a distance, sufficient to continue them constantly full to the requisite height. If possible they should be at some distance, but within view of the house or habitation, and the principal lawns and walks that are contiguous to it, and have intervening views from other parts of the ground; especially where the surface of the water is of considerable extent; but in small basons this is not material, as they have but little effect.

In regard to form and dimensions, they must vary according to circumstances: but where regular basons are intended, they may either be circular, oval, or any other shape, being proportioned in some degree to the nature of the situation, or part of the pleasure-ground in which they are formed, as well as to the supply of water that can be obtained.

When it is desired to have basons of water formed, so as to imitate nature, they may have bends, swells, and curves of different dimensions; and in some situations be made to imitate lakes, rivers, &c.; the extreme parts being sometimes turned in bold sweeps between projecting side plantations, so as that the termination may in a manner disappear, and seem in some points of view to extend in another direction.

The principal circumstances to be attended to in making basons, or pieces of water, are a proper supply of water at all times of the year, and the making them hold water perfectly at all seasons.

The first must depend upon situation; and in regard to the second, the most effectual method is puddling, or laying the bottom and sides of the cavities with strong well-wrought clay, twelve, fifteen, eighteen inches, or even more, thick, according to the quality of the natural soil; as the more the sub-soil inclines to a light loose texture, as gravel or sand, the greater thickness of clay should be allowed. Where the sub-soil is of a strong loamy or clayey kind, there is little

danger of its holding water naturally, or by a moderate thickness of clay being added.

When clay cannot be easily procured for the purpose, chalk is sometimes made use of in countries where it abounds, being first formed into a powder, and then wrought up into a sort of mortar, and applied over the bottom and sides, beating and ramming it hard as it is laid on.

And instead of clay, the bottom and sides are sometimes formed a foot thick with brick, or small stones laid in terrass, and plastered over with two or three inches thickness of cement, composed of two-thirds of powdered tiles to one of lime, which is beaten well, with as little water as possible, into a strong mortar. This is however an expensive method.

The depth of basons, or ornamental pieces of water, need not in general be more than three, four, or five feet at most, even where a boat is intended, or fish to be kept for breeding.

In forming the sides of the cavities or basons, they should have a gradual slope from the top of the circumference to the centre of the intended depth. And when the coat of clay has been applied, a few inches in thickness of gravel should be laid over it in order to preserve it, and render the water more clear: the surface of the surrounding ground should then be laid with turf, from the edge of the water to a suitable distance each way.

The raising of high banks or stiff slopes, as boundaries to basons of this sort, should always be avoided as much as possible; and where the water will admit, the ground should be sloped off gradually from some distance on the sides to the intended surface of water, so as that the superficies of the circumference, or rim, may correspond more perfectly with the general surface of the surrounding ground, and be more easy and natural; the whole surface of the water appearing as conspicuous as possible at a distance, being so managed as always to seem nearly as high as the superficies of the margin of the reservoirs.

In staking out the dimensions of the basons, where full coats of clay are necessary, it is requisite to set them out three feet and a half, or more, according to circumstances, wider than their intended widths, to allow for the suitable thicknesses of clay being laid on the sides, as well as for the gravel over the clay: they should also have depths in the same proportions.

Particular care should be taken to stake the superficies of the circumference perfectly level, that the water may appear regular every way at the margin.

In digging out the cavities of the basons, the

best method is to begin towards the middle, and excavate the earth to the intended depth; then to work off the sides regularly with a moderate slope from the edge of the circumference to the bottoms of the reservoirs.

When the cavities of the basons have been formed, they should be well rammed and smoothed: then the clay brought in, which should have been previously well wrought over and trodden. Then begin by laying the bottom in the middle, being careful that no extraneous matters be mixed with the clay to occasion cracks or fissures, spreading it regularly, a little at a time, and treading it well with the naked feet, watering it frequently during the process, and ramming it also from time to time with wooden rammers, every part being well kneaded that they may be perfectly compact and secure. During the operation, if the weather be dry, the clay should be covered, as it is laid, with mats or moist litter, or with the intended stratum of gravel, in order to prevent it from cracking, continuing the claying regularly each way from the bottom, till the whole is covered; the water being then admitted. The work is afterwards to be completed by turving the sides and slopes from the level of the water to such distances as may be necessary for producing the proper effect.

It is obvious that the forming of basons of this nature must be more expensive when made in such soils as are open and porous, than in such as are stiff and retentive, from the greater trouble and labour in claying them. This point should therefore be attended to before the work is begun.

The expense in digging out the excavations may be estimated at from nine-pence to eighteen-pence the yard, according to the nature of the soil and other circumstances.

BASS, a sedgy substance drawn from bass-mats, of which threads or strings are made that are extremely useful in the culture of various herbs and plants, as being the most cheap and ready for the use of gardeners in tying them up.

It is the best sort of bandage in grafting and budding; also for the tying up the stalks or stems of most kinds of flowering plants, the leaves of early cabbages, lettuces, endive, &c. to whiten and promote their heading; also for bunching up various sorts of pot- and other herbs, as well as for many other uses.

The Bass for these purposes should be quite fresh, and not taken from such old mats as have been used in the garden: where there is much tying, it is best to appropriate a mat or two entirely to this purpose, keeping them in the dry, and not drawing the Bass, as is often

BED

practised, from the mats that are designed for other uses; which soon spoils them.

It should be drawn out regularly when it is wanted, and cut into equal lengths; and in order to render it more pliable and tough, dipped in water; then tucked in the apron-string of the gardener, where it will be most ready for being employed.

BAY. See **LAURUS**.

BEAN. See **VICIA FABA**.

BEAN, KIDNEY. See **PHASEOLUS**.

BEAR-BERRY. See **ARBUTUS**.

BEAR'S-BREECH. See **ACANTHUS**.

BEAR'S-EAR. See **PRIMULA AURICULA**.

BED, a space of ground, three, four, or more feet in breadth, with length in proportion, formed in gardens for the more convenient culture of various sorts of crops, being mostly bounded by trodden paths. They are particularly useful in sowing and pricking out different kinds of small seeds and plants, affording much facility in the business of weeding, thinning, watering, covering, and gathering them. Where a greater depth of mould than usual is necessary, as in the common culture of Asparagus, &c. they afford the means of procuring it, by being raised above the general level of the surrounding ground.

Beds intended for the cultivation of asparagus, strawberries, onions, leeks, lettuces, endive, early radishes, and various other small seed crops, should in general be formed to the width of about four feet, having paths or alleys between them of different breadths, according to their nature; in the first mostly from a foot and a half to two feet, and in the others from half a foot to a foot.

In the culture of cauliflowers, brocoli, different sorts of cabbages, boorcole, and other similar plants, such kinds of beds are likewise extremely convenient for sowing and pricking out the young plants upon, previous to their being set out. In the growth of many sorts of pot-herbs, as mint, thyme, sage, marjoram, savory, penny-royal, tansey, tarragon, balm, hyssop, rue, &c., they are not only convenient, but afford a neat and regular appearance.

In the cultivation of plants of the flower kind, beds are also highly useful both for the ease of performing such operations as are necessary in promoting their growth and flowering, and for the convenience of viewing them. Some sorts also show to much more advantage when planted in beds.

For the different bulbous-rooted sorts, as hyacinths, tulips, lilies, &c. from three feet to three feet and a half are good breadths, with foot and half or two feet alleys; but for ranun-

BEG

culuses, anemones, crocuses, pinks, carnations, and various other kinds of the more choice flowers, three feet in breadth, with foot and half paths, are sufficient. Beds for this purpose are mostly edged in a neat manner with box or thrift. These kinds of beds are likewise the most proper and convenient for raising different sorts of flower plants upon, either from seeds, parting the roots, slips, or cuttings.

In nursery grounds for the rearing and growth of trees, shrubs, and other plants, beds of different dimensions must be employed; but for those of the low and smaller growth, those of four feet in breadth, with foot and half paths, are very convenient.

In forming beds of this sort, they should never be raised above the level of the natural ground, except where it becomes particularly necessary, either from the nature of the plants to be cultivated, or the too great retention of moisture in the soil, as, where they are much raised, the mould not only parts with its natural moisture too quickly in dry seasons, but the paths, by being much sunk, have a disagreeable appearance.

Particular constructions of beds are often requisite in the culture of particular sorts of plants, but these will be described in speaking of their culture.

BEECH-TREE. See **FAGUS**.

BEET. See **BETA**.

BEGONIA, a genus comprising a plant of the shrubby exotic kind.

It belongs to the class and order *Monoeceia Polyandria*, and ranks in the natural order of *Holoraceæ*.

The characters are: that in the male flowers there is no calyx: the corolla has four petals, of which the two opposite ones are larger, commonly roundish: the stamina have numerous filaments, fifteen to one hundred, inserted into the receptacle, very short, sometimes united at the base: the anthers are oblong and erect.

The female flowers are usually on the same common peduncle with the males; there is no calyx: the corolla consists in most species of five petals, in some six, in others perhaps four, commonly unequal. The pistillum is an inferior three-sided germ, in very many winged: the styles in most three, and bifid: the stigmas are six: the pericarpium is in most a three-cornered, winged, three-celled capsule, opening at the base by the wings; some are two-celled, and others perhaps one-celled.

The species principally cultivated is *B. nitida*, Shining-leaved Begonia.

In this species, the stems are almost upright, branched, round, smooth, as is the whole plant,

with alternate cylindric branches: the leaves are acute or acuminate, almost entire or obscurely toothed, seven-nerved; one lobe of the base is double the size of the other; the younger ones are rose-coloured about the edge; they are all very smooth and shining, of a bright green colour, paler beneath, permanent, spreading, four or five inches long, and two or three inches broad: the petioles are cylindric, thick, spreading, one-third only of the length of the leaf: the stipules are sessile, oblong, one-nerved, and as it were three-winged, from a rib winged underneath produced into a point; on the sides membranaceous and revolute; they are spreading, deciduous, and the length of the petiole: the racemes are compound, cymose, androgynous; the males very numerous; the females few at the top, solitary, axillary, on long peduncles, dichotomous, three inches wide: the peduncles upright, cylindric, longer than the leaf, the thickness of the petiole: the bractes opposite, below the dichotomies and the pedicels, half embracing, ovate or roundish, membranaceous, caducous: the corolla is flesh- or rose-coloured, sometimes of a dark red; in the female flowers six-petalled. It is an elegant shrub flowering from May to December, and is a native of Jamaica.

There are varieties with rose-coloured flowers; and with white flowers.

Culture.—These plants may be raised either by seeds, layers, or cuttings. The seeds should be sown in pots of light earth, in the early spring season, and brought forward by being plunged in a moderate bark hot-bed. When the plants have attained sufficient strength, they may be removed into separate pots, and placed in the stove.

In the second method the layers may be laid down in the early spring, and be taken off in the autumn, and planted in separate pots. The cuttings may likewise be planted out in the spring months, being transplanted into separate pots after they have become well rooted, and then placed again in the stove. The plants succeed well when kept in the bark-stove, or even over the flue of the dry stove, being very ornamental both in their leaves and flowers, which appear in the summer.

BELLADONNA. See **ANARYLLIS**.

BELLIS, a genus containing an elegant little perennial plant. The Daisy.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common hemispheric, upright: leaflets ten to twenty

in a double row, lanceolate and equal: the corolla is compound radiate: corollules hermaphrodite, tubular, and numerous in the disk: female ligulate, more in number than the leaves of the calyx in the ray. Proper of the hermaphrodite funnel-form, five-cleft: of the female ligulate, lanceolate, scarcely three-toothed: the stamina of the hermaphrodite filaments are five, capillary, very short: the anther cylindric and tubular: the pistillum is an ovate germ: of the hermaphrodite the style is simple: the stigma emarginate: of the female, the style is filiform: the stigmas two, patulous: there is no pericarpium: the calyx unchanged: the seeds solitary, obovate, and compressed: no down: the receptacle naked and conical.

The species which affords the cultivated varieties is *B. perennis*, Common Perennial Daisy.

This is sufficiently distinguished by its perennial root; truncate or præmorse at the end: the leaves are radical, inversely ovate or lanceolate, or rather spatulate, blunt at the end, notched and often waved about the edge, an inch or more in length, and about half an inch in breadth: scapes hirsute, solid at bottom, hollow at top, from two to four inches long, having sometimes a single leaf, and terminated by one radiate flower, frequently near an inch in diameter: the florets in the disk yellow, numerous (one hundred and fifty); in the ray white, often purple on the outside, and sometimes at the tip, amounting frequently to near fifty in number: the receptacle is surrounded by very small tubercles, which perhaps may be nectaries: the seeds are cordate-oblong or emarginate, compressed, surrounded by a whitish rim, bay-ash-coloured in the middle, having a few whitish hairs on them. It is a native of most parts of Europe; flowering almost all the year, shutting up in the night and in wet weather.

The Garden Daisies are all varieties of this species arising from cultivation, &c. They are very numerous: but the principal are the double white; red; white and red striped; variegated; scarlet and pied: double-quilled, or with fistular florets: double cock's-comb-shaped, white, red, and speckled: and the proliferous, childing or hen and chicken daisy, which is very curious.

Culture.—All the cultivated varieties of the Daisy are hardy, and succeed in most sorts of soils and situations, but in the most perfection in such as are of a mellow loamy nature, and which have not been enriched by manure. In this, they are capable of being increased and preserved, without varying, by parting and transplanting the roots annually in the autumnal or

very early spring months. Where they grow slowly, transplanting them every other year may be often enough. In performing this business care should be taken to select the largest, fullest, and best double varieties, rejecting all such as show any tendency to degenerate. Though the smallest portions will grow, it is the best practice not to divide them too much, as they produce a better show, and are not so liable to be destroyed by the summer heats. They should be planted out where they are to remain; or, if a large supply be necessary, the small slips may be planted together in rows in beds, six or eight inches apart each way. If they be planted in a warm sunny exposure, their blowing in the spring is considerably promoted. This is the method commonly practised in order to bring them early for sale in the markets.

Some plant them as edgings to beds, borders, or other divisions in gardens; but, from their being liable to be destroyed in the summer by heat, they are not well adapted to the purpose. Mr. Curtis, however, thinks that they produce a good effect in this way, and advises that they should be taken up in the beginning of the autumn, and then divided into single plants and set in trenches, three inches from plant to plant, and not put in holes by the dibble, the fibres of the roots being spread out, and the earth pressed closely to them. In this way they are less liable to be disturbed by worms. This work must be done every year, or the plants are apt to spread too much where they grow well.

These plants produce much variety and effect when properly distributed in patches in the fronts and other conspicuous parts of the borders and clumps of pleasure-grounds and gardens, in assemblage with other perennials of similar growth.

BELT, a stripe or breadth of land, planted with trees and shrubs on the sides or other parts of pleasure-grounds, for the purpose of ornament or shelter.

In forming plantations of this sort, attention should be had to different circumstances; such as situation, surface, ornamental effect, shelter, division, and the covering of such objects as may be wished to be concealed.

In the business of planting them, such a mixture and variety of trees should be introduced, as may afford the most agreeable and ornamental effects at all the different seasons of the year. In the arrangement of the plants, those of the largest and tallest growth should occupy the middle and back places; the fronts and more conspicuous parts being filled up by those of the less elevated and more shrubby growths.

All the deciduous and finest kinds of trees are proper for being employed in this way, in due assemblage with those of the evergreen and flowering kinds.

These plantations may be made either in the autumn or the early spring, according to circumstances; the former being the best where the soil is dry, but in moist retentive soils the latter should always be preferred. See **CLUMP**.

BENJAMIN-TREE. See **LACRUS**.

BERBERIS, a genus containing shrubby plants of the hardy deciduous kind. The *Piperidge Bush*.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Berberides* of Jussieu.

The characters are: that the calyx is a six-leaved perianthium: the leaflets are ovate, with a narrow base, concave, alternately smaller, coloured, and deciduous: the corolla consists of six roundish, concave, erect-expanding petals, scarcely larger than the calyx: the nectary consists of two small, roundish, coloured bodies, fastened to the base of each petal: the stamina consist of six erect, compressed, obtuse filaments: the anthers two, fastened on each side to the top of the filaments: the pistillum is a cylindric germ, the length of the stamens: the style wanting: the stigma orbiculate, broader than the germ, surrounded with a sharp edge: the pericarpium is a cylindric berry, obtuse, umbilicated with a point, and one-celled: the seeds two, oblong, cylindric, and obtuse: the second species has three seeds.

The species most generally cultivated are: 1. *B. vulgaris*, Common Berberry. 2. *B. Cretica*, Cretan Berberry.

The first is a shrub rising to the height of eight or ten feet: the stems are upright and branched, smooth and slightly grooved, brittle, with a large white pith, and covered with a whitish or ash-coloured bark, which is yellow on the inside. Both stems and branches are armed with sharp thorns, which commonly grow by threes: the first leaves are obovate, serrate-ciliate, not jointed: the stipules are terminated on each side by a capillary tooth: stem-leaves alternate; the lowest subpinnatifid with spiny teeth: the secondary leaves are in pairs; they are oblong and serrate; and between the lowermost leaves and the thorns smaller leaves are concealed: the flowers are in pendulous racemes towards the ends of the branches, with a bracte to each pedicel: the corolla is yellow: petals frequently serrate about the edge: at the base of each are two orange-coloured dots, which are probably the nectaries: the anthers are roundish and yellow: the stigma

is greenish: the berries are at first green, but when ripe turn to a fine red colour. It is a native of most parts of the East, &c. flowering in May and ripening the fruit in September.

There are several varieties: as with red fruit, and stony seeds; with red stoneless fruit; with white fruit; and with black fruit.

The second species never rises higher than three or four feet in this climate. It sends out many stalks from the root, which are strongly armed with spines at every joint: the leaves are produced without order, and are shaped like those of the Narrow-leaved Box-tree: the flowers come out from between the leaves, each upon a slender peduncle, but these are not succeeded by fruit here. It is a native of Crete, flowering in April and May.

Culture.—The best method of propagating these shrubs is by layers, which should be laid down in the autumn, as soon as the leaves begin to drop off; the young annual shoots being made use of for the purpose. They should be left till the following autumn, when they may be taken off and planted out in the situations where they are to remain. They may also be increased by suckers, which rise annually from their roots, but the plants produced in this way are more liable afterwards to send up such suckers.

Cuttings of the young shoots will likewise often strike root and form good plants, when planted out in the spring, and properly supplied with water. These may be set out in the following spring where they are to grow.

They are also capable of being raised by sowing the seed in beds of common earth in the autumn; and when the plants have attained one or two years growth, being removed into the nursery, and planted out in rows a foot apart, and eight or ten inches from plant to plant. They should be kept perfectly clean from weeds.

When plants of this sort are intended to fruit, they should be planted singly in an open situation, and the suckers that may be thrown up carefully removed annually in the autumn, as well as all such gross shoots as may be useless pruned out. By this means the fruit will be rendered finer and more plentiful than under other circumstances.

In the second species, the layers, after being taken off, should be planted out in pots, and protected in the winter in frames, till they have attained a sufficiently hardy growth to be set out in warm situations in the open ground.

The principal culture which these shrubs require afterwards, is that of keeping their straggling shoots out in annually.

These shrubs may be planted out towards the

back parts of large borders or clumps in pleasure-grounds, in mixture with other plants of the deciduous kind, as the fruit has a fine effect in the latter end of summer, and in the autumn. It also constitutes an excellent pickle, and an elegant garnish.

They are likewise sometimes planted so as to form a sort of hedge.

The latter species is more rare and curious than the former.

BETA, a genus comprising different plants of the hardy esculent biennial kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Horaceae*.

The characters are: the calyx is a five-leaved, concave, permanent perianthium; the divisions ovate-oblong and obtuse: there is no corolla: the stamina consist of five subulate filaments, opposite to the leaves of the calyx, and of the same length with them: the anthers are roundish: the pistillum is a germ in a manner below the receptacle: the styles are two, very short and erect: the stigmas are acute: the pericarpium is a capsule within the bottom of the calyx, one-celled and deciduous: the seed single, kidney-formed, compressed and involved in the calyx.

The species principally cultivated in the garden are: 1. *B. vulgaris*, Red Garden Beet. 2. *B. cicla*, White Garden Beet.

The first has large thick succulent leaves, which are for the most part of a dark red or purple colour: the roots are large, and of a deep red; on which circumstances their goodness depends; for, the larger they grow the more tender they will be, and the deeper their colour the more they are esteemed. It is a native of the southern parts of Europe.

There are varieties of this which principally differ in the size and colour of their leaves; as with long dark red root; with turnip root; with short, large, dark red root; and with red root and green leaves.

In the second sort the root seldom grows larger than a man's thumb: the stalks rise erect, and have oblong spear-shaped leaves growing close to the stalk: the spikes of flowers are axillary, long, and have narrow leaves placed between the flowers: the lower leaves are thick and succulent, and their foot-stalks broad: it is chiefly cultivated for these; the leaves being boiled as spinach, or put into soups, and the stalks and midrib of the leaf stewed and eaten as asparagus.

There are three varieties of this: the White-leaved, the Green-leaved, and the Swiss or Chard Beet. The last is probably the large va-

riety lately cultivated under the title of *Racine de Disette*, Root of Scarcity or Mangel Wurzel.

Culture.—All the different species and varieties of these plants are raised by sowing the seeds in the early spring months, as from the latter end of February to the middle of April, for summer crops, but the earlier the better, if the season will admit; and for successional crops, especially in the white kind, some seed may be put in occasionally in the summer months, till the beginning of August.

The most proper soils for plants of the red beet kind, are those of the more light deep rich sort, which incline a little to a sandy nature, such as are adapted to the growth of the carrot. In preparing the land, it should always be well dug over to the depth of twelve or sixteen inches, a little well-rotted stable dung being intimately blended with the mould at the time, if manure has not been applied for the preceding crop, which is by much the best practice. The ground should then be divided into beds of four or six feet in breadth, and the surface raked even for the reception of the seed, which may be put in either by sowing it thinly over the surface, and covering it by the rake, or in small shallow drills, made at the distance of six or eight inches from each other; but for the large-leaved white sorts, considerably more, as from twelve to eighteen inches or two feet, according to circumstances. But for some of these latter kinds the ground need not be trenched over to so great a depth as for the former, though it should always be spired when the root is the principal object, as is the case in the red sort, and occasionally in some others. Deep digging is absolutely necessary, as without it the tap root is apt to become short, and send off lateral fibres.

It is sometimes the practice with market gardeners, in order to save room, to sow these crops with those of onions and other kinds that are to be drawn out at an early period; but this should always, if possible, be avoided, as plants of different sorts seldom succeed well together, or answer the purpose of the cultivator.

In whichever method the sowing is performed, great care should be taken when the plants rise, which is mostly in the course of a month or six weeks, and have formed leaves an inch or two in breadth, to keep them perfectly clean, and thinned out to sufficient distances by repeated hoeing according to the kinds. By thus stirring the earth about the roots of the plants, and keeping them free from weeds, their growth is greatly promoted as well in their roots as the leaves.

The first sort is cultivated for the use of its large red esculent root, which in the common

kind often attains considerable length and thickness, and in some of the other varieties a still greater thickness, but less length. They become in a state of perfection and fit for culinary uses about September, or the following month; at which time some of them should be taken up, and after having the tops trimmed off, without injuring the crowns of the roots, be packed up under cover in dry sand or earth, to preserve them for the winter and early spring seasons. When the soil is dry, they are however frequently let remain in the ground to be drawn up as wanted. The largest and deepest red sorts are held in the most estimation, as being the most adapted to the purposes for which they are employed, whether for boiling and slicing, to be eaten alone or scraped, sliced in sallads, as a pickle, or for garnishing different sorts of dishes.

The common sort is chiefly cultivated as a principal crop, the varieties being mostly sown only in small portions.

The latter species and varieties are in a great measure cultivated for the use of their large succulent leaves, which are employed in soups, and boiled as spinach. In the large variety the stems and ribs of the large leaves are often made use of, after being stripped of the leafy part and the external skin, in soups and for stewing, to be eaten as asparagus.

They usually become in perfection for these purposes about the latter end of June, or in the following month, and may be continued nearly the year round by always carefully gathering the large outward leaves, the others thereby coming forward in succession, as well as further supplies produced from the roots.

The large Chard or Swiss variety is mostly cultivated in the field as a cattle-food; but may be grown in the garden, either for its leaves or the large roots: but with the latter view the leaves should not be pulled off while the plants are growing.

In all the varieties of these species, crops must be raised annually in the spring; as, though they may be continued two years by cutting down the seed-stems of the year-old plants as they rise in the second spring, the leaves are far inferior in size and fleshy substance.

For the purpose of procuring seed of the several species and varieties, some of the best and most perfect plants of each sort should be marked, and left in the second spring to stand and run up for seed; being supported with sticks during the summer, and gathered when perfectly ripe and dry, in the beginning of the autumn, as in September.

BETULA, a genus comprehending different

hardy deciduous trees, of the forest kind. The Birch and Alder.

It belongs to the class and order *Monocotyledonae*, *Tetrandria*, and ranks in the natural order of *Amentaceae*.

The characters are: that the male flowers are in a cylindric ament: the calyx is a loose, cylindric ament, imbricate on every side, consisting of three-flowered scales, in each of which are two very minute scales, placed at the sides. Three equal floscules are fixed to the disk of each scale of the calyx: the perianthium in each one-leaved, small, entire, three- or four-parted: the divisions ovate and obtuse: there is no corolla: the stamens consist of four, or three or two filaments very small: the anthers are twin: the female flowers in an ament of the same plant: the calyx is a cylindric or roundish, imbricate ament, with two-flowered scales: there is no corolla: the pistillum is an ovate compressed germ, proper, very small, and two-seeded: the styles two and setaceous: the stigmas simple: there is no pericarpium: the ament under each scale cherishing the seeds of two florets: the seeds are solitary and ovate.

The species chiefly cultivated in nursery gardens are; 1. *B. alba*, White or Common Birch Tree. 2. *B. nigra*, Black Virginian Birch Tree. 3. *B. lenta*, Canada Birch Tree. 4. *B. Alnus*, The Alder Tree. 5. *B. incana*, Hoary Alder Tree.

The first is easily known by the silvery colour of its bark, or rather the outer thin covering to the bark; by the smallness of the leaves in comparison with other timber trees; and the lightness and airiness of its whole appearance. It is of a middling or rather inferior size to other forest trees. The branches are alternate, subdivided, very pliant and flexible, covered with a reddish brown or russet, smooth bark, generally dotted with white. The leaves are alternate, bright green, smooth, shining beneath, with the veins crossing like the meshes of a net: the petioles are half an inch or more in length, smooth, grooved above; and at the base are ovate green glands. The male aments or catkins appear in autumn, keep on during the winter, and unfold their flowers when the females appear in spring; they are situated at the ends of the twigs, commonly two together, sessile, cylindric, blunt, long, narrow, and pendulous: the scales separating the flowers are roundish, acuminate, yellowish brown, and smooth: the female aments appear in spring at the ends of the shorter branches; they are solitary, at first upright, but afterwards nodding a little, cylindric or rather ovate, blunt, on pedicels near a quarter of an inch in length, shorter and thicker than the male aments: the scales have

from two to four flowers in each, they are lanceolate, blunt, green, and smooth; the germs two, sometimes more, compressed: the styles and stigmas are reddish. It is a native of most parts of Europe.

The chief variety of this is the Pendulous or Weeping Birch.

The second species has the larger serratures of the leaves deeper and more remote, and besides these very small, fine, crowded ones; the base from an obtuse angle is quite entire. The twigs are pubescent, and the petioles villose. The branches are spotted, and more sparingly set on the tree than in the common sort. The leaves are broader, and grow on longer petioles. It arrives at a much greater size, and is equally hardy with the White Birch.

There are several varieties of it: as the Broad-leaved Virginian Birch; the Poplar-leaved Virginian Birch; the Paper Birch; and the Brown Birch.

In the third species the leaves are smooth, very finely and sharply serrate. The female catkins are ovate, sessile, with acuminate entire scales. It grows to a great height.

There are several varieties, as the Dusky, White, Paper, and Poplar-leaved Canada Birch.

The fourth, though it appears as a shrub, frequently will however grow to a considerable tree. The bark is blackish, and in old trees full of clefts. The wood is red and brittle. The leaves are of a dark green colour, and a roundish figure, resembling those of the hazel, crenate, smooth, and in the common sort viscid to the touch: the nerves on the under side have spongy balls at the angles of their ramifications, as in the leaves of the lime-tree: the petioles are grooved above, and near an inch long; at the base of these are lanceolate, blunt stipules. The male catkins are cylindrical, appear in the autumn, and continue to the spring. The females are of a short conical form, like a small fir cone. It is a native of most parts of Europe.

There are several varieties: as the Long-leaved American, the White, the Dwarf, and the Cut-leaved Alder.

The fifth species is very distinct from the above, both in the structure of its parts, and its uses. It never attains the size of that, and is commonly shrubby: the trunk is scarcely thicker than the human arm: the wood is white, and of a closer texture: the branches and even twigs are testaceous, hoary, diverging at half a right angle: the leaves not round but ovate, drawn out at the end, unequally serrate with very sharp toothlets, sometimes doubly-serrate with very obscure incisions, very smooth, and somewhat glutinous even beneath, except at

the divisions of the nerves, where they have a close thick pubescence. The male catkins are sessile at the ends of the branches, usually by threes; they are two inches long, the thickness of a swan's quill, and the scales ferruginous: the female catkins, one on each side, having two or three bundles between the shining-brown testaceous scales, coming out with a leaf or two, alternate on the peduncles: when in flower they are of a brownish green colour, and of an oblong cylindric form: when ripe they are smaller than those of the common Alder, not divaricate, and in other respects different. It is a native of different parts of Switzerland.

There are many varieties: as the Cut-leaved, the Dwarf Alpine, the Long-leaved, and the Rose-flowered Hoary Alder.

Culture.—The soils most suited to the culture of the Birch are those of the light black loamy kind, on a dry sandy or gravelly substratum. In those of the more moist and retentive descriptions, it grows with rapidity, but soon decays, and the wood is not so valuable. It grows more slowly on those of the light sandy or gravelly kinds, and where the situation is exposed; but the timber is better.

All the species are capable of being raised by sowing the seeds; collected when the scales inclosing them begin to open in the autumn, on narrow beds of light earth, either at the above period or in the early spring months, covering them in a very slight manner. When the young plants appear they should be kept clean from weeds, and after they have attained sufficient growth be planted out in rows in the nursery-ground, at the distance of six, eight, or twelve inches from each other, having spaces of from eighteen inches to two feet between them. In these situations they may remain till they have attained a growth sufficient to be planted out in the pleasure-ground, as five, six, or eight feet in height. In the American sorts the seeds are supplied by the ships from thence.

They may also be increased by layers made from the young shoots of two-years growth. In order to effect this, a few trees of the best sorts wanted should be headed down in the autumn to the ground, to form shoots, which, by sending out lateral branches in a plentiful manner in the spring, fully answer the purpose. These are plashed and laid down into the mould, with their smaller shoots, when of sufficient growth; all of which soon strike root, and become fit to be taken off and planted out in the nursery-ground, in rows, at similar distances to the above, when they have had a twelvemonth's growth. These stools continue to afford supplies of fresh shoots, for being laid down, for several years.

While in the nursery the plants should be kept clean from weeds, by being frequently hoed among, and having the earth well stirred and loosened between them. During this period all such plants as are crooked and not handsome in their growth, or which are of slow and imperfect growth, should be cut over close to the surface of the ground, in order that they may shoot up again in better forms.

This is the best method of increasing all the varieties of both the common and other species, as they are liable to degenerate when raised from seeds.

With the common sort it is recommended by some, as the best and most ready method of providing this sort of plants, where it can be done, to collect them from woods or other places where they have risen naturally from seeds. They mostly succeed well when removed to better soils, and more open situations.

The fourth species, besides being raised in the two first of the above methods, is capable of being increased by cuttings of different sizes, when planted in such situations as are inclined to be moist. When these have had two or three years growth they may be removed into the places where they are to remain. They likewise grow well from large cuttings usually termed truncheons, when planted out in such situations as the above. These should be formed to the length of from two to three feet in length, being set one-third into the ground, holes being first made for their reception, and the bark wholly preserved upon the parts which are thus introduced. Upon this being perfectly attended to, much of the success of the planter depends.

The last species naturally affects such soils as are of the poor sandy or gravelly kinds: it may of course be employed where other trees cannot be introduced. It is capable of being reared in the same methods as the other species.

All the different species and varieties of these trees, when introduced in proper mixture with others of the deciduous kind, in large plantations, clumps, wilderness quarters, and belts of planting on the sides or other parts of pleasure-grounds, produce a good effect, affording much diversity by the great variety in their foliage and colour. The Weeping Birch and some of the other sorts have likewise an agreeable appearance, when planted singly on extensive lawns or open spaces. The foliage in the Alder, though full and pleasing, is but seldom observed in the plantations or other parts of ornamented grounds. It would seem, however, to deserve a place in such situations in all its different varieties.

From the juice of the common Birch, col-



Painted by Syd Edwards

London Published Jan 11800 by G. Kearsley Fleet Street

Engraved by F. Naylor

Bignonia radicans
1 Ash leaved Trumpet flower

Butomus umbellatus
2 Flowering Rush

lected by boring the trees in the early spring months, as about March or April, and introducing pipes, formed of elder, into the holes to conduct the liquor into bottles placed for the purpose of receiving it, a good and pleasant wine is prepared, by letting it afterwards undergo the process of fermentation.

The twigs and small branches of these trees may be occasionally cut over for the purpose of making birch brooms.

BIENNIAL PLANTS, such as are only of two years duration. These are of the esculent as well as the flower-kind.

There are various plants of this tribe, which being raised one year from seed, generally attain perfection, either the same or in about the period of a twelvemonth afterwards, and which in the following spring or summer shoot up stems, flower, and perfect their seeds; after which most of the sorts either soon wholly perish; or, when any particular sort survives another year, the plants assume a dwindling and straggling growth, and gradually decline. *Biennials* are consequently always in their prime the first or second summer after they rise: they must in general, of course, be raised annually from seed, for successional supplies in the different kinds.

The most common of the esculent kind are the *Cabbage*, *Savoy*, *Carrot*, *Parsnep*, *Beet*, *Onion*, *Leek*, and some others. And of the flowery tribe, the *Canterbury-bell*, *French Honeysuckle*, *Wall-flower*, *Stock*, *July-flower*, *Sweet William*, *China Pink*, *Matted Pink*, *Carnation*, *Scabious*, *Tree Mallow*, *Vervain Mallow*, *Tree Primrose*, *Honesty* or *Moon-wort*, and some others, all which rise the spring after being sown, and in the following spring shoot up into stem, flower, and perfect their seeds in autumn, after which most of them dwindle and decline, though the *Wall-flowers*, *Stocks*, *Sweet Williams*, and *Carnations*, sometimes survive, and flower the following year; but the plants become weak and straggling, and the flowers small and badly coloured. On these accounts it is necessary to raise a fresh supply annually, from seeds of all the different sorts. The *Wall-flowers*, *Carnations*, and *Pinks*, may however be continued by planting slips and layers in the summer, in a perennial state, in the utmost perfection.

BIGNONIA, a genus comprehending several plants of the shrubby and tree exotic kinds. The *Trumpet Flower*, or *Scarlet Jasmine*.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a one-leaved, erect, cup-form, five-cleft perianthium:

the corolla monopetalous, campanulate: tube very small, the length of the calyx: throat very long, ventricose beneath, oblong-campanulate: border five-parted, the two upper divisions reflex, lower patulous: the stamina consist of four subulate filaments, shorter than the corolla; two longer than the other two: the anthers reflex, oblong, as it were double: the pistillum is an oblong germ, the style filiform, having the situation and form of the stamens: the stigma is capitate: the pericarpium is a two-celled, two-valved silique: partition membranaceous, parallel and thickened at the sutures: the seeds are very many, imbricate, compressed, and membrane-winged on both sides.

The species chiefly cultivated for ornamental purposes are: 1. *B. Catalpa*, Catalpa and Tree Bignonia. 2. *B. sempervirens*, Evergreen Carolina Bignonia, or Yellow Jasmine. 3. *B. unguis*, Cat-claw Bignonia. 4. *B. radicans*, Rooting Ash-leaved Scarlet Bignonia.

The first is a deciduous tree, rising with an upright stem, covered with a smooth brown bark, to the height of thirty or forty feet in its native situation, but not nearly so high in this climate: it sends out many strong lateral branches, having very large, heart-shaped, or ovate, leaves on them, placed opposite at every joint. The flowers are produced in large branching panicles towards the end of the branches; they are of a dirty white colour, with a few purple spots, and faint stripes of yellow on their inside: the tube of the corolla is much shorter, and the upper part more spreading than in the fourth sort: the segments also are deeper cut, and waved on their edges. The flowers are succeeded by long taper pods in its native situation; but these have not as yet been produced in this climate. It is a native of South Carolina, and flowers in August.

The second species rises with slender stalks, which twist themselves round the neighbouring plants, and mount to a considerable height: the leaves come out single and opposite to each other at every joint: they remain green through the year. The flowers come out from the wings of the leaves at every joint, sometimes but two, at other times four at each joint; these stand erect, are trumpet-shaped, yellow, and have a very sweet scent; and, in the countries where they grow naturally, are succeeded by short taper pods filled with small winged seeds. It is a native of South Carolina.

The third rises with slender stems which require support. The leaves are small, ovate, entire, and placed opposite at every joint; at the same places come out the tendrils, by which the plants

fasten themselves to whatever grows near them: the flowers are axillary, and shaped like those of the Foxglove. They are not succeeded by pods in this climate. It is a native of the West-Indies.

The fourth species has rough stems, which send out many trailing branches, putting out roots at their joints, and thereby fastening themselves to the trees in their natural places of growth, and climbing to a great height: when it is planted against walls, it strikes into the mortar of the joints so strongly as to support the branches, and will rise to the height of forty or fifty feet. The leaves are opposite at every joint, composed of four pairs of leaflets, terminated by an odd one; they are serrate, and end in a long sharp point. The flowers are produced at the ends of the shoots of the same year, in large bunches; they have long swelling tubes, shaped somewhat like a trumpet, whence the plant has the appellation of Trumpet Flower. The corolla is of an orange colour, and opens at the beginning of August. It is a native of Carolina.

There is a variety of this with small flowers.

Several other species of this genus are equally deserving of cultivation.

Culture.—These plants are capable of being raised either from seeds, layers, or cuttings of the stronger shoots, according to the species.

In the first, the best methods are those of sowing the seeds, obtained from abroad, in pots of light fresh earth, in the early spring season, plunging them immediately in a moderate hot-bed of tan or dung: when the young plants appear, they should be placed in warm sheltered exposures till the autumn, when they require the protection of frames and glasses, or of a good green-house, free air being admitted when the weather will permit. After the plants have attained sufficient growth in these situations, they may be removed from the pots, planted out in warm situations where they are to remain, or in the nursery, protection being given them in the winter season when it proves severe.

Some however prefer raising plants of this sort by setting the cuttings of the young shoots in the early spring, in pots of the same earth, plunging them in moderate hot-beds till they have stricken full root, water and shade being occasionally given them, gradually as the summer advances enuring them to the full air, in order to harden them. On the approach of autumn, they should be taken under shelter of some sort when the weather is severe. In the spring following they may, if necessary, be

planted out where they are to stand, or be put in the nursery ground.

These plants succeed best in such soils as are rich, and rather inclined to moisture.

All the other species may likewise be raised from seeds, by being managed in the same manner as the preceding one; but a more ready method is by layers, made from the young shoots in the autumn or spring seasons; which may be taken off and planted out, either where they are to remain, or in the nursery-ground, after they have had a twelvemonth's growth. They are also capable of being increased by cuttings of the more strong shoots, planted out and managed in the same way as in the first sort.

In all the kinds, the plants raised from seeds are much longer before they produce flowers, than when they are propagated by layers or cuttings of the flowering plants.

The chief culture, after the plants are fully established, is that of cutting out all the small weak shoots of the preceding year, in the winter season, and shortening the stronger ones to the length of about two feet, in order to induce flowering shoots to be sent out for the ensuing summer. These plants are all of long duration, when carefully managed.

The first species, though late in putting out its leaves and flowers, is a highly ornamental shrubby tree, that may be introduced with propriety and great effect in the back but more conspicuous parts of large borders, or the middle of large clumps and other planted parts of shrubberies and grounds. When in full foliage it has a fine appearance, affording an agreeable diversity in such situations.

It is likewise well suited for planting out singly on the more spacious lawns or other open parts, where the situations are not too much exposed, as when permitted to take its natural growth it produces a good effect.

The second species is more tender, requiring the protection of mats or other coverings in winter, in the time of frosts, and the application of tan or litter about the roots. It succeeds best, and has the finest appearance, when planted against a warm wall, where it has room to climb and spread.

The third and fourth species are much more hardy, though they should have some protection when frosts occur in the winter. They are very ornamental when planted against high walls or buildings, especially the latter, as it will fix on the crevices, and extend itself over a vast surface. If trained up against high trees, it also produces a fine appearance when in flower.

BIXA, a genus containing a plant of the

evergreen shrubby kind. The Dyeing *Mitella*, Spanish *Anotto*, or French *Roucon*.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Columniferae*.

The characters are : that the calyx is a five-toothed, very small, obtuse, flat, permanent perianthium : the corolla is double : outer, with petals five, oblong, equal, large, more rude ; inner, with five petals like the outer, but thinner : the stamina have numerous filaments, setaceous, shorter by half than the corolla : the anthers are erect : the pistillum is an ovate germ : the style is filiform, the length of the stamens : the stigma parallelly bifid, and compressed : the pericarpium is an ovate-cordate, compressed capsule, fenced with bristles, bivalve, gaping at the angles, one-celled, with an inner bivalve membrane : the seeds are numerous, turbinate, with a truncated navel, and berried : the receptacle is linear, longitudinal, and fastened to the middle of the valves.

There is only one species, *B. Orellana*, American *Bixa*.

It is a shrub which in its native situation rises with an upright stem to the height of eight or ten feet, sending out many branches at the top, forming a regular head. These are garnished with heart-shaped leaves ending in a point, which have long foot-stalks, and come out without any order. The flowers are produced in loose panicles at the end of the branches, of a pale peach colour, having large petals. They are succeeded by a pulpy red fruit. This is a native of the East and West Indies. It is from the red pulp, covering the seeds of the fruit of this shrub, that the *Anotto* employed as a colouring ingredient is prepared.

Culture.—The propagation of this shrub is effected in this climate by sowing the seeds, which are brought from the West-Indies or America, in small pots filled with light rich mould in the spring, being then plunged into a gentle hot-bed of tan ; and when the plants appear, and are of sufficient growth, they should be carefully transplanted into separate pots, and again placed on heat, being shaded when necessary. During the summer they should be often refreshed with a very small supply of water, but in the winter very little, as their roots are apt to rot. A good degree of warmth is requisite at this season, in the tan-bed, while the plants are in their more early growth, to keep them from decaying in the tops. They require to be constantly kept in the tan-bed of the bark-stove, as they do not succeed so well in the dry stove. They are cultivated for the purpose of variety.

BLIGHT, a vegetable disease frequently at-

tacking fruit- and other trees, and plants, in the spring and summer months, and sometimes destroying their leaves, blossoms, branches, and fruit.

It has been supposed to proceed from very different causes, as the prevalence of easterly winds injuring the tender leaves and flowers, and causing them to wither and decay, and, by condensing the fluid that exudes from them, forming a food as well as nidus for the support and harbouring of various small insects, by which they not only multiply rapidly, but greatly increase the distemper that may have been commenced ; the effects of sharp hoar frosts succeeding hot sunny days in the vernal season, when the irritability of the parts has been greatly lessened by the action of the heat ; sudden severe morning frosts occurring at the time of flowering, or that of the fruit setting, or while it is in its very early growth ; the suddenly exposing the trees or plants to the full action of light and air, after they have been closely covered for some time ; the deficiency of the soil for the proper nutrition and support of the trees and plants ; the vitiated state of the circulating fluids ; and a defect of the vegetative process of the plants. The nature of this vegetable malady is not however yet perfectly investigated, or so well understood as to afford any very certain method of removing it.

In the first case, it has been proposed as the most effectual management, to have the trees or plants well washed with pure water in the early part of the day, when the weather is not frosty, in order that they may get perfectly dry before night ; or what Mr. Forsyth thinks much preferable is urine and soap-suds, which should be applied as early as possible after the disease shows itself ; and where the young and more tender shoots seem much affected, a fluid formed by putting caustic, lime, tobacco, sulphur, and elderbuds, into ten gallons of boiling water, in the proportions of one peck of the first, two pounds of the sulphur, and one of each of the other ingredients, cold water being afterwards poured on so as to make a hogshead. This liquor is to be made use of by dipping a woollen cloth in it, and washing the branches well with it.

In the second instance, or when the disease is produced by the effects of frost, the best mean which has yet been employed is that of covering the trees or plants by an open sort of netting, which is folded once or more as there may be occasion, as in this way air is freely admitted, and at the same time the danger of the frost avoided, without injury being done by close covering, as is the case when mats or other similar articles are had recourse to for the pur-

pose. Much of the good effect of this will, however, depend upon the correctness of the manner in which such protections are applied, and their not being so long continued at a time as to render the admission of the free air and light injurious to them. The trouble attending this practice may be in a great measure prevented by having such nettings or other coverings so contrived as to roll up and let down by cords and pulleys.

Where plants or trees have been covered for some time in a close manner, great care should be taken to gradually expose them to the full influence of light and air, as by such means much injury may often be prevented in the fruit and tender branches.

If distempers of this sort are caused in trees or plants from the improper quality of the soil, their not being suited to its peculiar nature, or its not being in a proper condition for their growth and support, which is shown by their great weakness and debility, and their imperfect growth in comparison of others that are situated exactly under the same circumstances; the remedy must be varied according to the particular cause from which it may seem to originate. Where the soil is improper, it should be dug out to some extent round the trees or other plants, and better fresh earth be supplied. If it be not suited to the nature of the trees, the best plan is to have them taken up at once, and removed into other more favourable situations, as it is not possible for every sort of tree or plant to succeed well in the same sort of soil.

When the malady depends on some morbid condition of the juices of the plants, or on the vegetative process being interrupted or imperfectly carried on, a speedy removal into another situation will be the only chance of effecting their safety; new mould being supplied, and their places filled by others.

Imperfect culture sometimes proves the cause of the Blight, as, when the pruning and training have been performed in an injudicious manner, or at an improper season, the trees are apt to become weak, and readily affected by the disease. The principal remedy in these cases is that of greater attention in these important operations, performing them in such a way as to leave the bearing branches as well as the trees in the most vigorous state of growth.

There is a state of plants and trees frequently occurring late in the spring, as in May, which is termed the *fire-blast*, often suddenly destroying not only the fruit and leaves of the plants, but the branches, and sometimes the whole trees. It mostly takes place in situations where they are planted close. It has been ascribed to vari-

ous causes; as certain transparent flying vapours acting so as to converge the rays of the sun in the manner of a burning lens; thus scorching the parts of the plants they happen to fall upon, in proportion to their convergency, and the reflection of such rays from hollow clouds producing their effects in a similar manner.

The only means of obviating these effects are those of planting fruit-trees in less close situations, and more open exposures, that they may have a more free admission and circulation of air to dispel such collecting vapours before they produce such effects.

It seems not improbable but that effects of the blight kind may sometimes take place in different sorts of plants and crops, from the prevalence of strong winds blowing from the sea, by their being saturated with saline matters, which they convey and deposit upon them at considerable distances, and which, by their decomposition on the plants, induce such affections.

BLITUM, a genus comprising different plants of the annual herbaceous ornamental kind. The Blite, or Strawberry Spinach.

It belongs to the class and order *Monandria Digynia*, and ranks in the natural order of *Holuraceæ*.

The characters are: that the calyx is a three-parted, spreading, permanent perianthium, the divisions ovate, equal, two more gaping than the other: there is no corolla: the stamina a setaceous filament, longer than the calyx, within the middle division, and erect: the anther is twin: the pistillum is an ovate, acuminate germ: the styles are two, erect, and gaping, the length of the stamen: the stigmas are simple: the pericarpium is a very thin capsule, (rather the crust of the seed) ovate, a little compressed, contained within the calyx now become a berry: the seed single, globular and compressed, the size of the capsule.

The species mostly cultivated for ornament are: 1. *B. capitatum*, Berry-headed Strawberry Blite; 2. *B. virgatum*, Slender-branched Strawberry Blite; 3. *B. Tartaricum*, Tartarian Strawberry Blite.

The first is an annual plant, with leaves somewhat like those of Spinach. The stalk rises about two feet and a half high, when cultivated in gardens. The leaves on the lower part of it are of the same shape with the root-leaves, only smaller. The upper part of it has flowers coming out in small heads at every joint, and is terminated by a small cluster of the same. After the flowers are past, these little heads swell to the size of wood strawberries, and when ripe have the same appearance; being very succulent, and full of a purple juice, which

stains the hands, and was formerly used for culinary purposes as a colouring ingredient.

There are varieties, with white and red leaves.

The second species seldom grows more than one foot high, with smaller leaves than the first, but of the same shape. The flowers are produced from the axils, almost the whole length of the stalk: they are small, and collected into little heads, shaped like those of the first, but smaller, and not so deeply coloured. It is a native of the South of France.

There are varieties, with striped leaves, and with white flowers.

The third rises near three feet high: the leaves are triangular, ending in very acute points, as also the indentures on the edges of the leaves. The flowers are axillary in small heads. The fruit is of the same shape and colour as those of the first, but smaller. This differs from that in the shape and indentures of the leaves; and in having leaves placed between the fruits the whole length of the stalk, which is not terminated by heads as in the first, but has leaves above the heads. Martyn supposes this is probably no more than a variety of the second sort.

Culture.—These plants are raised by sowing the seeds annually, in the early spring months, in patches of three or four together, in the borders or clumps where they are to remain, the mould in the places being broken down and rendered rather fine before they are put in. They may also be sown on beds of light earth, and when they rise to a sufficient growth be transplanted to the places where they are to grow, which should be done before the flowering stems rise. The first is the best method. A few may also be raised in pots for particular purposes, which must be kept occasionally watered in dry seasons, and supported by sticks.

When planted out in the natural ground, they must be kept clear from weeds, and properly thinned, and have support when necessary to prevent their being pressed down by the weight of the fruit. They often rise freely from self-sown seeds.

They are chiefly cultivated for the ornament which the fruit affords in the latter end of summer, which is as large as that of the common strawberry, and of a red colour. They have a good effect when set out in assemblage with other potted plants in conspicuous situations about the house.

BLOOD-FLOWER. See *HÆMANTHUS*.

BOCCONIA, a genus containing a shrubby plant of the exotic kind, for the stove. Tree Celandine or Parrot-weed.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Rhæadææ*.

The characters are: that the calyx is a two-leaved, ovate, obtuse, concave, caducous perianth: there is no corolla: the stamina consist of twelve filaments, very short: the anthers are linear, very large, the length of the calyx: the pistillum is a roundish germ, contracted both ways, large and pedicelled: the style one, bifid: the stigmas are simple and reflex: the pericarpium is subovate, attenuated to each end, compressed, one-celled, and two-valved: the valves are coriaceous, gaping from the base, the annular suture continuing; crowned with the style: the seed one, globular, the base involved in pulp, fixed to the bottom of the capsule.

There is only one species: *B. frutescens*, Shrubby Bocconia, or Tree Celandine.

It is a shrub which rises to the height of ten or twelve feet, with a straight trunk, as large as a man's arm, covered with a white smooth bark, and branched towards the top: the trunk is hollow, filled with a pith like the elder, abounding in a thick yellow juice: the branches are brittle, unequal, marked with scars from the fallen leaves: the leaves are from six or seven inches to a foot in length, oblong, sinuate-laciniate, subserrate, smooth, and ash-coloured-tomentose beneath: the petioles are roundish, and pubescent: the racemes terminating, panicled, a foot long, diffused and nodding: the peduncles are one-flowered: the bractes under the flowers are small and lanceolate: the filaments are ten, seldom more, longer than the leaflets of the calyx, hanging down and loose: the anthers are longer than the filaments: the germ is ovate, compressed, and glaucous. It is a native of Mexico, &c.

The acrid juice is sometimes used to take off tetters and warts.

Culture.—This plant is increased by sowing the seeds in pots filled with light earth early in the spring season, and immediately plunging them into hot-beds of tan, which have a moderate degree of heat; water being occasionally given in small proportions to promote the vegetation of the seeds. When the plants have acquired a sufficient growth, they may be carefully removed into separate pots of light sandy mould, and again placed in the hot-bed, shading them when necessary till they become well rooted, water being sparingly employed, till the plants have attained a ligneous growth, when it may be used with more freedom, especially in dry seasons, and large portions of air be admitted. When these pots become

filled by their roots, they must be again removed into larger ones, and replaced in the bark-stove, plentiful supplies of fresh air being admitted when the weather is suitable. With this culture the plants become strong, vigorous, and healthy in their growth.

The beauty of this shrubby plant should procure it a place wherever singularity and a diversity of effect are desired.

BOMBAX, a genus comprehending trees of the exotic kinds. The Silk Cotton Tree.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved, tubular-campanulate, permanent perianthium: the mouth three- or five-cleft, obtuse, and erect: the corolla is five-parted, and spreading: the segments oblong, and concave: the stamina consist of five or many scabulate filaments, the length of the corolla, connate at the base: the anthers are oblong, bent in, and incumbent: the pistillum is a roundish germ: the style is filiform, the length of the stamens: the stigma capitate, and five-toothed: the pericarpium is a large, turbinate-oblong, five-celled, five-valved capsule: valves woody: the seeds are very many, round and woolly: the receptaculum is columnar, and five-cornered, forming the partitions.

The species chiefly cultivated for variety in the stove are: 1. *B. pentandrum*, Pentandrous Smooth Bombax; 2. *B. heptaphyllum*, Heptaphyllous Smooth Bombax; 3. *B. Ceiba*, Cuba or Thorny Bombax.

The first has smooth stems, which in the young plants are of a bright green, but after a few years are covered with a gray or ash-coloured bark, which turns to a brown as the trees grow older: they seldom put out any side branches till they arrive at a considerable height, unless their leading shoot be broken or injured. The branches towards their top have leaves composed of five, seven or nine smooth, lanceolate leaflets, joined to one centre at their base, where they adhere to the long footstalk. These fall away every year, so that for some time the trees are naked; and before the new leaves come out, the flower-buds appear at the ends of the branches, and soon after the flowers expand: they are composed of five oblong purple petals, with a great number of stamens in the centre; when these fall off, they are succeeded by oval fruit larger than a swan's egg, having a thick woody cover, which, when ripe, opens in five parts, and is full of a short dark cotton, inclosing many roundish seeds as large as small peas. It is a native of the East Indies.

The second species in its natural situation grows fifty feet high before it branches, and is near eighteen feet in thickness. The bark has smooth, shining, sharp prickles, which fall off on the body, but remain on the branches: the leaves are seven-lobed, and united at the base; and the flowers are succeeded by large oval fruit containing seeds and cotton. It grows every where in Malabar.

The third sort has the trunk closely armed with short, strong spines: the branches come out near the top, and are covered with leaves, having five long spear-shaped lobes, uniting at the base; the flowers appearing at the ends of the branches, which are succeeded by large oval fruit, filled as in the preceding. This has been supposed to be the same with the first sort; but, from many years' experience, Mr. Miller affirms, that seeds sent him of the two sorts always produced different plants, and continued the same at more than twenty years growth.

Culture.—These plants may be increased by sowing the seeds, obtained from the West-Indies, in the early spring season, on a gentle hot-bed, or in pots of light fresh earth, plunging them into the tan-bed. When they have attained sufficient growth, they may be removed into separate pots, and be replaced in the hot-bed, water and shade being given when necessary. As they advance in growth they must be shifted into larger pots filled with fresh loamy earth: water should be admitted freely in the summer season, but very moderately during the winter, as the roots are apt to be destroyed by much moisture: during their whole growth air should be supplied freely when the weather will permit, to prevent their being drawn up in a weak unhealthy growth. They must be constantly retained in the hot-house or stove.

Though they attain a large growth in their native situations, they only acquire a shrubby stature when cultivated in this climate. From the singularity and contrast which their leaves afford to those of other plants, they produce a striking diversity in large houses, where they have sufficient room to grow to a full size. From their slowness in flowering in their native state, they seldom produce any here.

BONTIA, a genus comprising a plant of the evergreen exotic kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a one-leaved, five-parted perianthium: the leaflets are blunt, upright and permanent: the corolla is one-petalled and ringent: the tube long and cylindric: the border gaping: the upper lip

upright and emarginate: the lower revolute, and semitrifid, the size of the upper: the stamina consist of four subulate filaments, bending to the upper lip, the length of the corolla: two higher: the anthers are simple: the pistillum is an ovate germ: the style is simple; situation and length of the stamens: the stigma bifid, and blunt: the pericarpium is an ovate drupe, with the top oblique: the seed an oval nut, one-celled, and germinating.

There is only one species cultivated for ornament in the stove; *B. Daphnoides*, Daphnolike Barbadoes Wild Olive.

In this the leaves are thickish, rather stiff, very smooth, and green on both sides; the lower ones are very slightly toothed: the corolla is yellowish, with a line of dusky purple along the middle of the lower lip. It rises ten feet in height. The flowers come from the sides of the branches, and are succeeded by large oval fruit, which occasionally ripen here. It flowers in June.

Culture.—Plants of this sort may be easily raised from seeds, which should be sown on a moderate hot-bed early in the spring, that the plants may acquire strength before winter. When of sufficient growth, they must be planted out into a separate small pot filled with light fresh earth, and plunged into a moderate hot-bed of tanners bark, water and shade being given until they have taken root; after which they must have a large share of air in warm weather, and be often refreshed with water. In winter they should be placed in the stove, where they should have a moderate degree of warmth, and but little water. They require much air in summer, but will not succeed well if exposed abroad in cold summers; they should therefore remain in the stove among plants which require a free air. In this management they mostly produce flowers and fruit in three or four years.

They are also capable of being propagated by cuttings, which should be planted out in the summer; being put into pots filled with light rich earth, and plunged into a moderate hot-bed, water and shade being given until they have taken root; after which they must be treated as the seedling plants.

These plants, from their being evergreen, and having a pyramidal form, make a pretty variety in the stove, in assemblage with other plants of the exotic kind.

BORAGE. See **BORAGO**.

BORAGO, a genus containing herbaceous plants of the hardy annual and perennial kinds.

It belongs to the class and order *Pentandria*

Monogynia, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a five-parted permanent perianth: the corolla is monopetalous, rotate, the length of the calyx; the tube shorter than the calyx: border five-parted, rotate, and flat: throat crowned with five emarginate obtuse prominencies. The stamina consist of five subulate converging filaments: the anthers are oblong, fixed to the inside of the filaments in the middle, and converging: the pistillum consists of four germs: the style filiform, longer than the stamens: the stigma simple: there is no pericarpium: the calyx larger, and inflated. The seeds are four and roundish, being wrinkled, and keeled outwards at the top, globular at the base, and inserted longitudinally into a hollowed receptacle.

The species chiefly cultivated in gardens for use or ornament are: 1. *B. officinalis*, Common Annual Borage; 2. *B. orientalis*, Oriental Perennial Borage.

In the first the whole plant is rough, with white, stiff, prickly hairs; the peduncles terminating and many-flowered; the calyx divided to the very base, and also the corolla, but it falls off in one piece; the tube very short and white; the segments acute; filaments very short, white, and springing from the claws of the petal, with a sharp blue process where the anthers are inserted: these are of a blackish or dark-purple colour, and form a kind of *umbo* in the middle round the flower. The common colour of the corolla is blue, but it varies to flesh-coloured and white. It is an annual plant, and flowers from May to August. It is a native of Aleppo, but naturalized here, &c.

There are varieties, with red flowers, with white flowers, and with variegated leaves.

The second species is a perennial plant, with thick fleshy roots, spreading under the surface: the root-leaves are many, oblong, and heart-shaped, on long hairy foot-stalks: the flower-stem rises more than two feet in height, having at the joints a single, small, sessile leaf; the upper part branches out into several small foot-stalks, which are terminated by loose panicles of flowers of a pale-blue colour: the petal is turned back, so that the connected anthers and style are left naked. The seeds are smaller than those of common Borage. When the flower-stalk first appears the flowers seem collected into a close spike, some of which often spread open before the stalk is six inches high; but, as the stalks advance, they divide into many loose spikes. It is a native of Constantinople, and flowers in March.

There are other species, which may be cultivated where variety of these sorts of plants is wanted.

Culture.—These plants are easily propagated, either by the seeds, or dividing the roots according to the kinds.

In the first sort, the best mode is by sowing the seeds annually in the autumn or spring months in the places where the plants are to stand, or by letting the plants shed their seeds, keeping them from standing too closely together. When they are intended for the produce of their tender young leaves, they may be sown broadcast in small beds at different times, from the spring till autumn, in the garden, covering the seed by the rake; afterwards, when of proper growth, keeping the plants thinned out to a good distance, as six or eight inches, or more. In this way supplies of green leaves and flowers are provided in succession, for summer, autumn, and the following early spring.

The second species is increased with much facility by parting the roots, and planting them out where they are to remain, in the autumn. It may also be raised by sowing the seeds at the same season, where they are to remain, keeping the plants while young perfectly free from weeds.

The first sort, and varieties, will succeed in almost any soil or situation, being perfectly hardy; but the latter species, as the flower-stems are put forth very early in the spring, requires a dry soil, and warm aspect, to guard against the effects of frost. Such effects are much obviated by having their roots planted in dry lime or other rubbish, as well as their over luxuriant growth prevented, and the danger of frosts consequently greatly lessened. When these plants have been once planted, they continue for many years with little trouble, and are not liable to be injured by the vicissitudes of heat or cold.

The first species is employed both as a plant of utility and ornament, being valued by some for culinary purposes, as a pot-herb; and for the young leaves and flowers to be made use of in the way of sallads, as well as for being put in wine to form cool tankards. It may also be planted on borders or clumps in pleasure-grounds for variety.

The latter sort is wholly employed as a flowering ornamental plant.

BORBONIA, a genus comprising plants of the shrubby exotic kind, for the green-house.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Leguminosæ*.

The characters are: that the calyx is a one-leaved, semiquinquefid, turbinate perianthium, half the length of the corolla: divisions lanceolate, acuminate, rigid, pungent, and subequal; the lowest longer than the rest: the corolla is pentapetalous, papilionaceous, and hirsute on the outside: banner reflected, and obtuse: claw the length of the calyx: wings semicordate, a little shorter than the banner: keel two-petalled, lunulate, and obtuse: the stamina have nine filaments, united into a cylinder gaping longitudinally above, rising at the ends: the anthers are small: the pistillum is a subulate germ: the style very short, and ascending: the stigma obtuse and emarginate: the pericarpium is a roundish legume, acuminate, one-celled, mucronate with a spine: the seed kidney-form.

The species mostly cultivated for ornament and variety are: 1. *B. lanceolata*, Spear-leaved Borbonia; 2. *B. cordata*, Heart-leaved Borbonia; 3. *B. crenata*, Notch-leaved Borbonia.

The first has a stem a foot high, smooth, round, and ash-coloured: divided into a few branches, which are red whilst young: the leaves are stem-clasping, long, narrow, ending in a sharp point. The flowers come out from between the leaves at the ends of the branches in small clusters: they are yellow, and shaped like those of broom. It flowers in August and September.

In the second species the leaves are broader than in the first: the stalks are slender, and covered with white bark: the leaves are stem-clasping, and terminated by sharp points, like those of butcher's broom. The flowers are produced in small clusters at the ends of the branches, and are of the same shape and colour as those of the above sort, but larger. The calyx is five-cleft, nearly regular, hirsute, with spiny segments, and the whole corolla tomentose on the outside.

The third has the leaves cordate stem-clasping, net-veined, and pointed: the flowers are in racemes.

All these species are natives of the Cape.

Culture.—These plants may be increased either by sowing the seeds obtained from abroad in pots of light loamy earth as soon as procured, and when of proper growth in the autumn placed in an old tan hot-bed under frames to be protected during the winter from frost and too much moisture; and in the spring sowing, plunged in a moderate hot-bed in order to promote the vegetation of the seeds, and when the plants have attained a sufficient growth, removed into separate small pots, being replunged into the hot-bed, proper shade and water being given; or by laying down

the young root-shoots in the beginning of September, in which operation the joint to be laid in the earth should be slit upwards in the manner practised for carnations, the bottom bark of the tongue being taken off. They require a considerable length of time in this way before they are sufficiently rooted to be separated from the parent plant. They should then be placed out in separate pots, and deposited in warm sunny exposures in the green-house, and managed as other plants of that sort.

In the seed method of raising the plants, which affords the strongest, they should be gradually exposed to the open air, and set out in warm protected situations during the summer, being returned to the green-house as the autumn approaches, having as much free air and sun as possible. They require little water in the winter, but frequent small refreshings are necessary while they are placed out in the summer.

These plants have a pleasing ornamental effect, and afford an agreeable variety in the green-house in the winter season, as they do not stand in need of artificial heat.

BORCOLE. See **BRASSICA**.

BORDER, a narrow stripe or portion of ground running along the sides of the walls or other fences that inclose gardens and ornamented lands, and which bound the walks, or serve to separate the different principal divisions of the former; the earth being usually laid up in a gently-sloping manner from the front to the back parts.

These compartments are either of the useful or ornamental kind.

Those of the first sort are such as are carried round the walls of garden-grounds, and which are mostly employed, especially where the aspect is to the south, in planting out various sorts of fruit-trees upon, such as apricots, peaches, nectarines, cherries, figs, plums, apples, pears, &c. in order to their being trained to them, so as to form wall-trees, as well as extremely useful in raising different early esculent herbs, roots, and leguminous crops on; and in the other aspects for the sowing, rearing, and pricking out many sorts of seeds and plants on, in the summer season, that require at particular periods of their growth a cool situation or a degree of shade. The general rule in laying out these borders is that of making them have breadths in proportion to the height of the walls or pailings towards which they are formed, which should never be less than eight or twelve feet. They were formerly made not more than five or six feet in breadth, which is too narrow for convenience in the culture of plants or the management of the trees that may be planted on them.

When trees are to be planted as espaliers, ten or twelve feet are the breadths that should in most cases be allowed.

Borders intended for the raising and growth of different sorts of flowers on, or for small shrubs, herbaceous plants, and flowers, being planted out in assemblage or mixture with each other, five or six feet in the former and eight in the latter may be the proper breadths for the purpose.

Their depths when trees are to be planted should never be less than two feet at the walk, gradually increasing to three at the back or fence: some sorts of fruit-trees, however, require much more, as pears and plums. In other cases, one foot at the walk and two at the back may form a sufficient depth and slope for the perfect culture of the crops that may be grown upon them. For flowers and the small sorts of shrubs it is often convenient to have them a little rounded on the surface.

There is another sort of useful border, which is that which divides or surrounds the principal compartments or divisions of kitchen-garden-grounds, and which immediately bounds the main walks, as being convenient for planting ranges of dwarf apple, pear, plum, cherry, medlar, and other trees upon as espaliers, as well as for the culture of many herbaceous esculent plants; the line of espalier trees in these cases being planted at least three or four feet from the outer edges, so that there may be a three-or-four-feet border on the outsides next the walks, and a smaller one on the insides of the espaliers; the broader outside borders serving for the rearing and culture of many low-growing esculent plants, and sometimes, where the kitchen- and flower-garden are united, as a flower-border. The smaller inward borders may be found useful in raising many sorts of small plants and herbs, as lettuces, &c. See **ESPALIER**.

In borders of the latter or ornamental sort, as those of pleasure- or other grounds, they must be formed according to circumstances. It was formerly the taste in many places to have almost every walk bounded on each side by a border embellished with various ornamental plants; this taste has now, however, in a great measure given way to that of planting only on one side. A line walk, ornamented on each side by spacious borders fully planted with curious flowering shrubs and other plants, has notwithstanding a fine appearance and good effect in many situations.

Borders of curious flowers, carried along the boundaries of grass-plats or lawns contiguous to the house, whether formed in a straight or serpentine manner, produce an agreeable effect and much variety.

Borders for particular kinds of flowers, such

as the curious sorts of hyacinths, tulips, ranunculuses, anemones, carnations, and various others, may be made either along the sides of walks, or detached in other parts of gardens or ornamented grounds.

Where the situations in which the borders are made are of the more moist retentive kinds, having clayey or gravelly cankerly bottoms, proper drains should be formed and conducted along the fronts of the borders, to the full depth of the sub-soils, in order effectually to convey off the injurious wetness that may take place, and allow of a suitable bed being formed for the upper soil. This is often done by paving the bottoms of the beds with tiles or bricks. But a much less expensive and at the same time effectual method is advised by the author of the "Scotch Forcing Gardener," which is that of letting the bottoms be laid in a sloping manner from the walls to the drains, a fall of six inches being given, first with a layer of good loam two inches in thickness, spread evenly and well rolled down; then a similar stratum of clean pit or river gravel applied over it, and forced down in the same manner: upon this another coat of loamy earth is to be deposited to the thickness of an inch or more, and well pressed down; the whole being executed while the materials are in a rather dry condition; the whole being afterwards a little moistened and well rolled down till the surface becomes glazed, the waterings and rollings being continued alternately till the whole acquires a shining hardness, and the gravel begins to show itself clearly through the loamy coat. In this way it is asserted a bottom may be formed, through which the roots of no trees can penetrate, and which is, at the same time, perfectly favourable to the growth of trees and plants.

In constituting the borders, those substances and mixtures of different materials which are most adapted to the growth and success of particular sorts of trees or plants, will be explained in describing the culture which they require.

Where the raising and growth of most sorts of culinary vegetables are the principal objects of borders, there should be constantly a due proportion of good vegetable mould in combination with a proper quantity of rich, mellow, loamy earth, a suitable portion of well-rotted stable-dung, according to circumstances, being incorporated with them, to produce crops in the greatest perfection.

Such borders as immediately bound or verge gravel- or sand-walks, should be planted on the sides with edgings of some dwarf evergreen sort of plants; such as those of box, thrift, daisies, pinks, &c. but the first is the neatest

and most durable plant for this purpose. See *BUXUS* and *EDGING*.

These borders should always be raised two or three inches, or more, above the common surface level, such as are detached being generally finished off in a gently swelling or rounding form, in order that they may afford the fullest effect.

BOSEA, a genus affording a plant of the shrubby exotic kind. The Shrubby Golden-rod. It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Diadelphica*.

The characters are: that the calyx is a five-leaved, equal perianthium: leaflets roundish, concave, and erect, thinner at the edge: there is no corolla: the stamina consist of five subulate filaments, longer than the calyx: the anthers are simple: the pistillum is an ovate-oblong, cuspidate germ: the style and the stigmas are two: the pericarpium is a globular, one-celled berry; one seed, round and acuminate.

The only species is the *B. Yervamora*, Golden-rod Tree.

This is a rather strong woody shrub, with a stem as large as a middling person's leg; the branches come out very irregularly, and make considerable shoots in summer, which should be shortened every spring, to preserve the heads of the plants in any tolerable order: these branches retain their leaves till towards the spring, when they fall off, and new leaves are produced soon after: the bark is reddish-brown, and smooth; the wood being white: the leaves are two inches long, and one and a half broad, roundish, broader at the base, blunt at the end, and white underneath, resting on short petioles: the ribs purple. The flowers come out of the ends of the twigs, on alternate pedicels, at the base of which is a stipule: the calyx is purplish, and six-leaved: the seed of a black colour.

It is a native of the Canary islands.

Culture.—The plants in this species may be increased, by planting cuttings of the young shoots, in the early spring months, in pots of light fresh mould, placed under glasses, or in a moderate hot-bed, by which their striking root may be much expedited.

It is deposited in the green-house in assemblage with others of similar growth.

BOSQUET, a term applied to detached clumps, or other parts of gardens, pleasure- or ornamented grounds, planted with a variety of deciduous and evergreen trees or shrubs, and herbaceous perennial flowers, either in a regular or irregular manner. They should be laid out in forms suited to the nature, extent, and particular circumstances of the ground, so as to produce,

the greatest possible variety and effect, some being made circular, others oval or oblong, and with bendings, sweeps, or swells, outward or inward, and larger or smaller, as may be necessary. They may be dispersed with the greatest effect on the confines of extensive lawns or other open spaces, in grass, also in parks, paddocks, the terminations of spacious avenues, and carriage-ways leading to the houses, especially when of considerable dimensions, being varied in situation, and distributed at such distances as to leave large intervening spaces of open land in grass.

In the planting of compartments of this nature, in order to produce the best effect, much attention should be bestowed in regulating the sizes of the plants, their shades, and times of flowering, as well as in the disposing them in the order of their different growths, so that they may rise regularly from the sides to the centres, and display themselves in the best and most advantageous manner in their heads and branches.

It was formerly the practice to plant trees and shrubs of the deciduous and evergreen kinds chiefly together in separate patches, but by a judicious mixture of both sorts a great richness and variety of effect is produced. Various sorts of tall herbaceous perennial plants, as well as low flowering ones, may be introduced on the sides and edges, such as those of golden-rod, and other similar kinds, with daffodils, violets, polyanthus, primroses, and many others of the same sort.

In the less extensive sorts of ornamented grounds, these sorts of bosquets should always remain perfectly open, and wholly exposed to view, in order that the full variety of the plants may be seen; but in extensive parks, and other similar grounds, where they are chiefly planted with the more large and coarse hardy trees and shrubs, they may be inclosed by open hurdles to defend them from the cropping of cattle or other animals, especially until they have acquired a sufficiently large growth.

These clumps, after being thus planted, only require the earth among the plants to be slightly dug over in the autumn or very early spring, and once or twice hoed over in the summer to keep weeds from rising; the dead wood and irregular branches of the different plants or trees being cut out, shortened and removed, to preserve them distinct and keep them in due order. See **CLUMP**.

When well arranged, and kept in neat order, these sorts of bosquets produce much diversity and ornamental effect, both in large gardens and pleasure-grounds.

BOWLING-GREEN, a spacious plat laid evenly with turf, in pleasure- or other grounds, designed for the purpose of ornament as well as amusement in the summer season by bowling upon. These sorts of compartments should mostly be formed as near the habitations as possible, being laid out on the back or side fronts, so as to serve by way of lawns to such parts; or they may be situated at the terminations of walks or avenues. They may also be contrived amidst detached contiguous plantations, or wilderness quarters, to serve as portions of sward ground, or as openings to such places, and should always have tall trees so situated on the boundaries as to afford shade, especially in the afternoon.

The dimensions must vary according to circumstances; but where there is scope of ground sufficient, they should not be less than from half an acre to an acre. The most common form is that of a square, moderately extended; but some are made oblong, others circular; though, to suit the general plan or figure of the ground, they may be of any other form, so as to avoid the garden ground. Their boundaries may also be a spacious planted border, of either the straight or serpentine kind.

The plane or surface of the green should be perfectly level, and as high at least as the general level of the adjoining ground, so as that it may be always preserved free from stagnant water.

In forming these plats, the surface should be levelled in the most exact manner, and laid with the finest grass-turf that can be procured from a close, pasture, common, or down. See **TURF**.

The extents and proper levels of the greens being then set out with stakes, placed round the extremities or boundaries at fifteen or twenty feet distance, on which are marked the determined levels of the ground, and from which, on the opposite sides, levels in other cross-ways at the same distances should be made; and then, according to these levels, proceed by line and spade to form the ground to a proper surface, making it up firmly in lines from stake to stake; the panels or spaces between being made up equally firm and regular, so that no part may sink in hollows afterwards. The whole should then be raked level, and finished off evenly and smooth: two or three inches deep of light sandy soil, or any light dry poor earth, may then if necessary be laid evenly over the surfaces, as equal in quality as possible, as by that means the turf or grass will form a more fine, regular, and even sward.

The grassy surfaces should always be formed

by laying them with fresh cut turf, as being superior to the method of only sowing them with grass seeds.

The turfs should be cut each a foot wide, a yard long, and about an inch thick, and laid with exactness, closely joining them edge to edge; then beating them well down with large wooden beaters, repeatedly rolling them with a large heavy iron roller. The best season for performing work of this sort is the autumn or very early spring; but the first is to be preferred where it can be conveniently done, as the turf has time to establish itself well before the hot season sets in. See **TURFING**.

In order to keep bowling-greens neat after being thus formed, they require frequent mowing in summer, probably once a week or oftener, in order to keep the grass sufficiently fine and short for bowling on, as well as occasional rolling to preserve the surface firm and even. When worm-casts are much thrown up over their surfaces, they should be poled to break and scatter them, and then well rolled down with a wooden roller, to which the scattered earthy particles may adhere, and the surface be thereby rendered more clean. See **POLING-GRASS**.

Where coarse weeds appear, such as the dock, dandelion, &c. they should be immediately eradicated from the very bottom, in order that they may be prevented from scattering their seeds and multiplying themselves, by which the turf would be rendered unfit for the intended use, and at the same time have a disagreeable appearance.

BOX-THORN. See **LYCIUM**.

BOX-TREE. See **BUXUS**.

BRASSICA, a genus comprising various esculent plants, of the Cabbage, Borecole, Kale, Colewort, Cauliflower, Broccoli, and Turnip kinds.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosae*.

The characters are: that the calyx is a four-leaved, erect perianthium: leaflets lanceolate-linear, concave-channelled, gibbous at the base, erect, parallel, and deciduous: the corolla is tetrapetalous, and cruciform: the petals are subovate, flat, expanding, entire, gradually lessening into claws, nearly the length of the calyx: four ovate nectarous glands; of which there is one on each side between the shorter stamen and the pistil, and one on each side between the longer stamens and the calyx: the stamina consist of six subulate, erect filaments; of these; two opposite ones are of the length of the calyx; and four longer: the anthers are erect, and acuminate: the pistillum is a columnar germ, the length of

the stamens: the style is short, the thickness of the germ: the stigma capitate, and entire: the pericarpium is a long silique, somewhat like the shaft of a column, but flattened on both sides: partition with a prominent columnar top, two-celled, two-valved; valves shorter than the partition: the seeds are many and globular.

The species principally cultivated for culinary purposes are: 1. *B. oleracea*, Common Cabbage; 2. *B. Rapa*, the Turnip.

The first, or common Cabbage, as it is found in its wild state on the sea-shores of this country, has the stem-leaves very much waved, and variously indented; the colour is sea-green, but frequently with a mixture of purple; the lower ones somewhat oval and sessile, the upper almost linear: the flowers are large: the leaflets of the calyx ovate, broad and yellow: the siliques short and swelling: the root is biennial; the stem upright and fleshy, having a large head of oblong roundish leaves, which in some of the varieties are large, close, and compact, but in others loose, spreading, and open.

All the different varieties of cultivated or Garden Cabbage are supposed to proceed from this species. Those in most general culture are, the Heading Common Cabbage, *B. oleracea capitata*, of which there are several sorts or varieties, some coming into perfection during the summer season, others in the latter part of the autumn.

Of the first sorts there are the early summer kind, as the Small Round Early Cabbage, and the Large Oblong Early Cabbage; the former coming into use in the beginning of May, and the latter towards the end of the same month; the Sugar-loaf kind, as the Early Dwarf Sugar-loaf Cabbage; Large Hollow Sugar-loaf Cabbage: the first, coming in early in June, is very fine while young; the latter is in perfection the two following months, and is highly valuable for family use; the Early York Cabbage, which is a roundish oval quick-heading cabbage, that comes into use from May till July, and which is valuable as a principal early and summer crop, as well as for light cabbages in the autumn and winter. The Early Battersea Cabbage, which is of similar shape and growth, is ready early, and excellent while young. The Early Russia Cabbage is likewise very useful in the same state.

Of the latter, or autumn and winter sorts, are, the Common Round White Cabbage, which is hardy, of a middling size, round, and very white, coming into use in the latter end of summer, as August and the following month. It is an useful sort of cabbage. The Long-sided Cabbage, which is large, and of an oblong

shape, and comes into use about the same time, continuing till November, is also valuable. The Hollow Cabbage is likewise a large and good tender sort, being fit for use nearly about the same period. The Drum-head or Flat-topped Cabbage is a large hardy kind, for late use; but is now chiefly cultivated for cattle. The Musk Cabbage, which is a middle-sized, tender, crisp kind, having a musky scent and continuing good till a late period. The Giant or Great Scotch Cabbage, which is a close-heading large sort, continuing for late use. It is much employed for cattle. The American Cabbage is also a large good kind, as likewise the Devonshire Cabbage, but chiefly for field culture. The Red Cabbage, which is a thick-leaved, close-heading, hard sort, of a deep red colour, principally employed for the purposes of pickling or sallads, from the beginning of autumn till the following spring.

The Savoy Cabbage, *B. ol. Sabauda*, having a roundish, oblong, closely-cabbaged head, constituted of roundish, crumply, curled leaves.

The varieties principally cultivated of which are: the Common Green Savoy, the Large Green Dutch Savoy, the Yellow Savoy, the Round-headed Savoy, the Oval-headed Savoy, and the Sugar-loaf Savoy.

These are all excellent cabbages for winter use, as standing the frosts better than most other sorts, and forming large heads without cracking.

Fimbriated Open Cabbage, or Borecole, *B. ol. fimbriata*, which has a tall stem, with an open loose head at the top, constituted of oblong, cut, fimbriated, curled leaves, spreading openly without any tendency to cabbage.

The principal varieties introduced into cultivation are: the Green Curled Borecole, the Red Curled Borecole, the Thick-leaved Curled Borecole, and the Finely-fringed Borecole.

The perennial sorts of Borecole, with variegated leaves are also sometimes cultivated as ornamental plants.

Siberian Borecole, Scotch Kale or Kale, *B. ol. sabellica*, which has a strong stem topped by a large open head, formed of oblong, roundish, broad, thick, cut, curly leaves, but which does not cabbage.

There are several varieties in culture; as the Reddish-brown Kale, Dark-red Kale, and Green Kale.

Green Common Open Colewort, *B. ol. viridis*, which has a short stem with an open head at the top, constituted of leaves of a somewhat oblong form, without cabbaging.

Turnip Cabbage, *B. ol. napobrassica*, which has the stem and root swelling out so as to form

turnip-shaped bulbs, being crowned with a head of open oblongish leaves which do not cabbage.

The cultivated varieties are, the Turnip Cabbage with the bulb above the ground, and the Turnip Cabbage with the bulb below the ground.

Clustered Brassica, or Cauliflower, *B. ol. cauliflora botrytis*, which has a rather short upright stalk, topped by an open head of oblong, narrow, plain, entire leaves, which do not cabbage, but contain a clustered flower-head in the middle.

The varieties employed in cultivation are, the Early Cauliflower, and the Late Cauliflower.

Though this is supposed a variety of the common Cabbage, improved by cultivation, there seems a specific difference between the two plants, both in their growth and produce; as in the common Cabbage they are broad, roundish, and thick, while in the Cauliflower they are long, narrower, erect and pointed, as well as less numerous.

They are easily distinguished when the plants are young; the former putting out one upright stem from the centre, which afterwards divides into several branches; while the latter sends out many flower-stems from the part which is eaten, which is a compact collection of the heads of these stalks, dividing afterwards into so many stems, and branching out into many spreading shoots, so as to form a large spreading head when in flower, but never rising pyramidically as in the former.

The Cauliflower is said to have been first brought to this country from the island of Cyprus.

Italian Cabbage, or Brocoli, *B. ol. Italica*, which has a strong erect stalk, with a large open head at the top, constituted of dark and light green oblong plane leaves, not cabbaging, but forming a clustered flower-head in the middle.

The varieties usually in cultivation are: the Early Purple Brocoli, which is a plant of moderate growth, producing smallish purple heads at an earlier period than in the others; the Purple Brocoli, the Green Brocoli, and the Blue Brocoli. And in the Late Purple Brocoli, which grows much stronger and forms larger and more perfect heads, they are the Purple-headed Brocoli, Dwarf Purple Brocoli, Blue Brocoli, Brown Brocoli, Green Brocoli, and Yellow Brocoli.

The White or Cauliflower Brocoli, which is a curious sort that grows strong and forms large close heads resembling those of the Cauliflower.

The Black Brocoli, which is a hardy sort growing high, but producing in general smaller and

less perfect heads than the others. Of this there are the Dark or Black-headed; the Brown, and the Blue.

All the varieties of the different sorts are frequently produced by the same seed; but they may be kept in a great measure distinct by proper care in the culture.

The second species of this genus, the Turnip, is sufficiently known by its round fleshy roots; which however vary exceedingly in their form, size, and colour, in a cultivated state, in which only they are apt to be viewed. The leaves which arise immediately from the root are very large, of a full green colour, rough, and jagged or gashed almost to the midrib. From the midst of these, early in the second season of its growth, springs a stalk four or five feet high; the leaves on which are very different from the root-leaves; being oblong, pointed, embracing the stem, smooth and glaucous. The flowers are yellow, and placed on long, slender, smooth peduncles: the siliques or pods are cylindric; and the seeds are of a reddish-brown colour, not unlike those of Cabbage.

There are many varieties, chiefly distinguished by the form of the bulb or root, and which proceed from the difference of soil, situation, and culture. The principal employed in the garden are the Early Dutch Turnip, the Early White Stone Turnip, the Large Later Stone Turnip, and the Early Red Stone Turnip. These are the best and most proper sorts for the early spring and summer crops; the bulbs or roots being of a moderate size.

The White Round Turnip, the Green-topped Turnip; both of which form large roots, and are proper to succeed the above sorts as garden crops.

The Red-topped Turnip, the Yellow Dutch Turnip, the Oblong White Turnip, the Tankard Turnip, the Large Norfolk Turnip, and the Hardy Russia Turnip. These are most commonly made use of as field turnips, as being large-rooted, and of pretty hardy growth. They may however be cultivated in the garden as winter and early spring crops, especially the last sort.

The Long Round French Turnip, and the Purple Turnip. The former of these, from its long small root, is of little use in gardens; and the latter is principally cultivated for its singularity. There are other varieties, but these are sufficient for our purpose.

Culture in the Cabbage kind.—The Cabbage is a sort of plant that may be raised on almost any sort of soil, but succeeds to most advantage on those of a rather strong loamy nature,

and which have a good depth. The ground in its preparation should be well dug over to a full spit depth, and a sufficient proportion of well rotted stable-dung incorporated with it; or, when it is of the more light or sandy kind, cow-dung may be employed for the purpose, and when very stiff, some sort of calcareous material may be made use of, with different kinds of ashes.

The most proper situations for these crops are those of the more open and exposed kinds which have a rather southernly aspect.

In the culture of these plants it is usual to distinguish them into summer and autumn kinds, from the crops coming into use at these different periods. The seed for the former should be sown about the first or second week in August, and till the beginning of September, but not later; and for the latter every three or four weeks from the beginning of February till the end of May, according as successions are wanted.

The plants of the autumn sowings should be set out principally in October and the following month, and the remainder about the middle of February, after being preserved during the winter; and those of the spring sowings as they become in a proper state for the purpose from April to the end of June.

In order to raise the plants in the best perfection, a piece of rich mellow ground in an open situation should be employed, which should be well dug over, and formed into as many four feet wide beds as may be necessary, the surface being raked in an even manner. Seed of the different varieties should immediately be sown separately upon them, rather thinly, but as regular as possible, being lightly raked in. It is of much importance to the success of the sowings to have new well ripened seed. If the weather be moist the plants soon appear, but when dry it is of great utility to water the beds occasionally. It is the usual practice when the plants have attained a proper size, as when the leaves are an inch or two in breadth, to prick some of the strongest plants out into other similar beds, in rows six inches apart, and three or four inches from plant to plant, to remain till the time of setting them out; a plentiful watering being given at the time: but where the seed has been sown sufficiently thin, and the plants kept properly thinned out and perfectly free from weeds, this operation is unnecessary, the plants remaining in the seed-beds without sustaining any check in their growth by being pricked out.

In finally setting out the plants, portions of ground in open situations should be provided, and prepared for the purpose, by digging them

well over, and incorporating with the soil a suitable quantity of well-rotted stable-dung. The plants are then to be put in with a line and dibble, in rows at suitable distances, according to the kinds, the quality of the soil, and the seasons of planting. For the small early sorts from eighteen inches to two feet from row to row, and from twelve to eighteen inches in the rows; but for the larger sorts a distance of two feet and a half every way should be allowed. Some advise for the more early summer crops much narrower distances in the rows, in order that the plants in each intermediate row may be cut in the early spring as greens, the others being left to form cabbages; which in many cases is probably a good practice: and when wanted as young cabbages, they may be obtained more early in this season by having them tied up with bass. When the crops set out in the autumn are much injured by the severity of the winter, the places of the destroyed plants should be filled up as speedily as possible from those in the beds.

It is not necessary to sow or plant out such large crops of the smaller more early sorts as of those of the larger and more late kinds, as they will not continue so long fit for use.

The Red Cabbage crops may be sown and set out at the same periods as in the common sorts; but the principal crops should always be planted out in October and April, on good ground, in open exposures well prepared by digging and the application of manure, being set out at greater distances than in the other crops, as from two and a half to three feet.

In the Savoy kind the plants are raised by sowing fresh seed at different times, as in August, and from the beginning of February until the middle of April or later. These sowings should be made as in the preceding cases, and the plants be managed in the same manner.

Some of the autumn-raised plants may be set out in October and the following months, if open weather, and wholly in the beginning of spring; and those raised from early spring sowings should be planted out finally as soon as the plants are of proper growth. The general crops of the later spring-raised plants may be planted out occasionally as ground is cleared, from May till August; those planted out early being set two feet and a half distant every way, and the next crop about two feet; but the latter plantings need not be planted at more than a foot and a half distant.

It is sometimes customary to plant out the summer crops of these plants between rows of forward beans, peas, kidney-beans, cauliflowerers, early cabbages, and other plants that

stand distant in rows, and are soon to come off the ground; as by this practice some time is gained: but the plants are generally finest when they are planted out in a clear open spot of ground, previously well dug over for their reception. In performing the summer plantings, it is of much advantage to choose moist weather for the work, otherwise watering must be employed several times till the plants have stricken root.

The only culture which any of the crops of this sort require after being finally planted out, is that of having the ground well hoed over among the plants two or three times, as the weeds advance in growth; and when the plants are sufficiently large, to loosen and draw up the earth well about their root-stems as often as may be necessary, in order to strengthen and promote their growth.

As the stalks of the summer crops of Cabbages afford considerable supplies of good greens, some of them should constantly be left in the ground for this purpose. The York and Sugar-loaf are the best in this intention.

In order to save seed, some of the best plants of the different varieties should either be suffered to stand where they grow, or be planted up to the heads in a dry piece of ground in the autumn, in order that they may run up to seed in the following spring, care being taken that they be as distant as possible from other sorts, lest they be made to degenerate. Some employ the stems that have been cut over for this use. The seed should be let remain till it is fully ripened, which is mostly about the latter end of July, or in the following month, when it should be collected by cutting of the pods, or taking the whole branches, and, when exposed a little to the sun, be thrashed out upon a cloth, and put up in bags for use. It is necessary to support the seedling-stems by sticks or other means, and to be careful in keeping the birds from devouring the seed as it begins to ripen.

It is the practice in many places to cultivate Cabbage-plants for the purpose of being eaten in their green state, or as they begin to form little central heads, as Coleworts at different seasons. The early sorts are the best for this use. The plants should be raised by sowing the seeds in the summer, autumn, and spring months, as directed above; and, when they are of sufficient growth, be planted out where they are to stand, in rows about a foot distant, and six or eight inches apart in the rows.

They only require afterwards to be kept free from weeds by hoeing, and to have a very little mould brought up about their root-stems. If

the leaves be tied up when they show for hearting, it renders them more forward, as has been already seen.

In cutting, especially with the spring crops, it is often the custom, where they are extensive, to take every other row, and sometimes every other plant in the remaining ones as they begin to heart, leaving the rest to cabbage in a more perfect manner. By these means a more abundant produce is afforded.

Culture in the Borecole kind.—The culture in the different varieties of these plants is much the same as in those of the Cabbage. The plants are raised by sowing the seeds annually, from March to the beginning or middle of April for the main crops, and a smaller portion in the beginning of May for a succession. They should all be sown in open situations, not too thick, and raked in;—a quantity of the plants, when the leaves are an inch or two broad, being pricked out four or five inches asunder, to remain five or six weeks to obtain a proper degree of strength; to be planted out finally in June and July, in rows two feet or two feet and a half asunder, and for the late crops early in August, planting these in rows two feet apart, and eighteen inches in the rows. Moist weather should be chosen for this purpose.

But it is probably a better method to let them remain in the seed-bed till the periods of setting them out where they are to remain.

A small crop may also be sown in autumn, or the beginning of August, to stand the winter in young growth, and be planted out early in the spring in order to be of the largest full size in the following autumn.

The plants require to be kept clear from weeds in their early growth, and to have the earth brought up well about their root-stems occasionally as they advance in size.

The sorts mostly cultivated are: the Green Curled Borecole, Red Curled Borecole, Thick-leaved Curled Borecole, and the Finely-fringed Borecole.

The plants mostly rise with a thick stalk often a yard or more high, surmounted by a large head of thick leaves, in some spreading horizontally every way, being finely fringed and curled, but in others growing more contractedly. They never form close heads. In all, the stems produce numerous fine sprouts early in spring, closely surrounding them for some length, and which, as well as the principal or main top heads, boil exceedingly green and tender: the main heads come in for use in autumn and winter, and the sprouts early in spring.

The Siberian Borecole, or Scotch Cale, is another sort, some varieties of which grow tall

in the stem, with large open heads; others shorter and more strong in the stem, with larger heads of broad curly leaves, in some spreading out, and in others standing erect, but without any tendency to form close heads or cabbage. These are not so much in use as the above sorts; but as furnishing shoots plentifully after the heads are cut, they may be usefully cultivated for supplies in winter and early spring.

All the varieties are so extremely hardy as to be capable of withstanding, in a great measure, the severest winter seasons.

Besides these varieties of Borecole, which are cultivated for culinary purposes, there are others of the perennial kind, with variegated leaves and shrubby branching stems, constantly retaining their leaves, which are grown as ornamental plants.

These are mostly raised by planting the offset-slips, or slips of the side-shoots, in the early spring or summer seasons, supplying them well with water till they have taken root, and become well established in the ground.

The Green Colewort is another plant of the Open-headed Borecole kind, that is sometimes cultivated for culinary purposes, though it has lately given way to the Cabbage Coleworts, as being less tender and sweet. It is raised by sowing the seeds in July and August, as in the Cabbage Colewort kind, and setting the plants out in open situations in the autumn and early spring months.

The Anjou Cabbage or Colewort is also of the Borecole kind, having a very large open head. It is raised by sowing the seeds and setting out the plants in similar situations and preparations of the land, and at the same periods as in the other sorts. But the plants must have more room allowed them. They likewise require the same sort of culture while growing.

Chou de Milan, or what is usually known by the title of *Brussels Sprouts*, is a sort of Open-headed Colewort, which is likewise cultivated for culinary uses, as affording abundant supplies of sprouts at almost all seasons.

The method of culture and increase with these is the same as in the other Coleworts, as well as by planting pieces of their perennial roots, which grow readily and increase very rapidly. Good ground well dug over and enriched by manure in an open exposure should constantly be employed for the purpose.

Culture in the Turnip-Cabbage kind.—The method of cultivation with plants of this sort differs but little from that employed in others of the Cabbage kind.

The plants are propagated by sowing the seeds annually in March, April, and June, on

beds, as in the Cabbage; the plants being set out from May to July or August in an open compartment, in rows two feet and a half asunder, keeping them clean from weeds, and drawing only a little earth about the bottoms of the stems occasionally. The turnip-part is usually fully grown by Michaelmas, and continues all winter for use.

They may also be sown where the plants are intended to remain, and be hoed out to a proper distance.

This last is probably the best method of culture.

There are two sorts cultivated; one with the turnip above the ground, the other with the turnip below the ground. The plants rise and proceed in their growth, as in the open Coleworts, till they begin to form bulbs.

It is the globular- or turnip-part of the plants that is used, being sometimes sliced in soups, and by some used as common turnips; but, unless employed when quite young, they are rank and unpalatable.

The chief merit of these plants is their hardiness, as they are capable of withstanding the hardest winter.

They require good ground well manured to bring them to any great size.

Culture in the Cauliflower kind.—There are, as has been seen, two sorts of this plant cultivated in the garden, the Early and the Late Cauliflower; but they differ only in the former coming in a little sooner than the latter.

It is customary among gardeners to have three or four crops of this vegetable in the course of the year; as an early summer crop, a main summer crop, a late summer crop, and an autumn, or what is often termed a Michaelmas crop. These different crops are obtained by sowing and setting out the plants at different times. The most proper times of sowing for the two first crops are in the latter end of July and beginning of August; and for the two last in the latter end of January, the middle of March, and the beginning of May. These sowings should be made in open situations where the soil is light, mellow, and of a good quality, the ground having been prepared by digging it well over, and raking the surface even. The seed should be sown rather thinly, and covered by raking or sifting a little earth lightly over it. It is of much consequence to have the seed perfectly new and fresh, and such as has been collected from the best and most perfect plants. The January sowing may be made on a slight hot-bed, the plants being afterwards managed as directed below.

When the weather is droughty, gentle water-

ings may be necessary in the evenings before as well as after the plants appear; and when it is very hot, it is useful to shade them a little in the middle of the day. The plants are commonly up in the course of a week or ten days. After this they only require to be kept clean from weeds, and to have water given them occasionally till they have leaves of about an inch or two in breadth; when it is mostly the practice to prick a quantity of the finest plants out into other beds of good earth, in rows at the distance of five or six inches, and four or five in the lines. All the deformed and black-shanked plants should be laid aside as useless. After the plants have been thus pricked out, a moderate watering should be given, especially when the weather is dry, and repeated as there may be occasion. The plants raised on the hot-bed, as well as some of those from the autumn seed-beds, may be pricked out at once into the frames where they are to remain during the winter. In these situations they are to continue, air being freely admitted when the season will admit, and the plants occasionally refreshed with water. They should also be well guarded against frosts and cold, until the periods of their being set out where they are to grow and form heads.

Some of the plants of the first sowings should be set out in the autumn, as in October or the following month; and the rest about the middle of February or the beginning of the following month, under glasses or some other sort of protection; and those of the other sowings in the beginning of April, and in May, June, and July, according as they were sown.

For the purpose of planting out these sorts of plants, proper beds of the richest mellow ground, in the best defended and warmest part of the garden, in a free exposure to the full sun, should be provided, being well dunged with the best rotten horse-dung, such as that of old cucumber and melon beds, or any other of similar quality, spreading it equally over the ground, at least three or four inches thick; and the whole then regularly trenched-in one good spade deep, burying the dung equally.

Where the plants are to be situated under glasses, the ground should be formed into beds a yard wide, with foot-wide alleys for the convenience of going in, to raise and set off on the glasses; but in other cases this is unnecessary.

In the first method, the plants are then to be put in, allowing three to each glass, though the London gardeners often plant more; but two of the best are enough to be left to come to perfection. At the time of planting them out, a quantity of the handsomest, straight, clear-shanked plants should be chosen; which being ready, a

line should be stretched along the middle of the beds, and at every yard distance three plants put in in a triangle, six or seven inches or more apart, a little water being given afterwards, and the glasses put on, which should be kept close about ten or twelve days, when the plants will have taken fresh root; then prop them up on the sunny side about three inches high with forked sticks, or pieces of brickbats: or wooden pegs fifteen inches long, each having two or three notches an inch or two above one another, to receive the edge of the glass, may be more convenient, as, by sticking them in the ground, the glasses may be readily propped higher or lower on any side, as occasion may require.

During winter, the glasses should be kept almost constantly over the plants, only keeping them tilted on the props in mild weather, on the warmest side, for the admission of air: in fine mild dry days, the glasses may however be set quite off; which, if the plants be forward in growth, should be practised at all opportunities, lest, by too constant glassing, they be drawn into flower in their small winter growth and rendered useless: but the glasses must always be put over the plants at night, and when cutting winds or frosty weather prevail, kept close down. In severe frost they must also have long litter laid close about the lower part of each glass, raising it higher as occasion shall require.

In their spring culture they must be thinned out about the beginning or middle of March, to one stout plant or two at most under each glass, though, in large bell-glasses, the market-gardeners frequently leave more, for the sake of having the advantage of the glasses to bring as many as possible to early perfection. The others should be planted out into another place, as a piece of the same rich well-dunged ground, the plants being raised with the point of a trowel, to preserve the fibres of their roots, and planted two feet and a half distant each way, water being given immediately to settle the earth about their roots.

The plants under the glasses should have the earth directly made good about them, and a little mould drawn up about their stems, continuing to cover them occasionally with the glasses, which must now be raised considerably on props, in proportion to the advanced growth of the plants; not omitting to let them have the benefit of the full air in mild days, and that of warm showers, by occasionally setting the glasses wholly off. The glasses are to be continued occasionally over the plants until the middle or latter end of April, or longer if it be necessary.

When the plants are so far advanced as that the

leaves press against the glasses, they should be raised, by forming a border or ridge of earth round each hole of plants, three or four inches high, on which the glasses should be set, continuing to prop up one edge occasionally as before: and according as the plants advance in growth continue to prop up the glasses on every side three or four inches in height. As the length of the days and warmth of the weather now increase, and the plants grow freely, they require as much free air and scope to grow in as it is possible to allow them under the glasses. At the same time care should be taken to continue to expose them occasionally to the full air in fine days and moderate warm showers, defending them with the glasses in the nights, and in cold rains or boisterous weather, until it becomes warm, and the plants are grown too large for the glasses; when they should by degrees be fully exposed night and day, till the use of the glasses be wholly unnecessary.

At this period, if the weather be hot and dry, moderate waterings will be of utility in promoting the progress of the plants as well as increasing their size and strength.

In planting out the summer crops from the plants that have been preserved in frames or other situations and those plants raised from seed in the spring months, open spots of ground prepared in the same manner as those for the other crops should be provided; and the plants be put in by a line and dibble, to the distance of from eighteen inches to two feet or more each way, water being immediately given if the weather be not moist, and occasionally repeated till they have taken fresh root.

It is the practice sometimes with market-gardeners, in order to make the most of their ground, to sow thin crops of radishes and spinach between the rows of cauliflower-plants; but this is not by any means advisable in other cases.

The chief circumstances to be attended to in the planting of these sorts of crops are: those of providing good healthy strong plants; preparing the ground with due attention; using a suitable proportion of manure; setting them out in due time, not setting the plants too deep in the ground; and to prevent their being injured by damps and the slug.

The culture which all the different crops require is only that of keeping them perfectly clean from weeds by occasional hoeings, and the drawing up the earth about the roots of the plants two or three times as they advance in their growth. The more perfectly this business is performed, the more vigorous is the growth of the crops.

When the plants of any of the crops, but especially those of the earliest, begin to show flower, they should be examined frequently, and, where they are found, the inner leaves turned down over the heads to screen them from rain, the sun, and full air, in order to preserve them more white and close; as, when fully exposed to the weather, it generally changes the fine white colour to a yellowish hue, and occasions the head to open before it becomes perfectly formed.

The excellence of the plant consists not only in size, but in the whiteness and compact curd-like growth of the head; such as have a frothy loose appearance being inferior in value.

It is in its utmost perfection of growth when the outward parts of the head begin to open and expand; after which the whole soon divides, and shoots up to flower and seed.

In cutting these crops, the flower-head should mostly be cut off with some inches of the stalk, together with most of the surrounding leaves, which should be trimmed down nearly equal to the circumference of the head, especially when for present use; but, when required to be kept a few days, and such as are intended for market, should have the full leaves to continue, trimming them off as wanted. As the stalks of these plants never produce sprouts, as in those of the cabbages, they should be removed as soon as the head is cut.

It is common in some places to preserve some heads of the latest crop in dry cellars or other places, by taking them up with their roots, and putting them in sand, keeping them as dry as possible, and carefully removing such parts as decay.

Saving seed.—It is of great importance to have good seed in the culture of this plant, which cannot be obtained without saving it, as that which is purchased can seldom be depended on. For this purpose, some plants of the earliest crops are to be selected, which have the largest, most perfect, compact, firm, white heads, and permitted to remain to run up to stem and form seed, which is usually perfected about the beginning of September. The plants should be well supported, and the seed be collected as it ripens, care being taken to guard against the birds. Some should be saved every year, as old seed cannot be depended upon.

Culture in the Brocoli kind.—There are, as has been seen, several sorts of this plant in cultivation; but the Brown, Green, and Purple succeed best for early crops, and the White for the principal and late crops.

All the different varieties of Brocoli are raised from seed sown annually in the open ground.

The season for sowing the main crops of all the varieties is March and April for the autumn and winter production, and May and the beginning of June for the principal succession crops, to come in for the spring supplies.

Some may occasionally be sown so early as February or beginning of March of the Cauli-flower Brocoli; as also any of the Purple kinds, in order to obtain an earlier autumn production.

The seed should be sown on a good soil in an open exposure, as the plants rise much stronger than on narrow borders under walls. Each sort should be sown separate, not too thick, on the surface, raking them in lightly; the plants appear in ten or twelve days; occasional waterings being given in dry weather; and when they have leaves an inch or two broad, it is proper to prick them out in a nursery-bed three or four inches apart, giving them water as soon as planted, and occasionally till they have taken root; in which bed let them remain a month or six weeks to acquire strength: by these means their shanks will be short and of robust growth, and be considerably better prepared for planting out where they are to stand than those which remain in the seed-bed.

The times of planting them out are; June, July, August, and the beginning of September, according as they were sown, or are desired for use.

The ground for setting them out upon should be good, well prepared by digging over, and enriched by good stable dung. The plants should then be planted in rows two feet and a half asunder, and two feet distant in the lines; but for those planted late two feet at most between row and row is sufficient, and eighteen inches distant in the rows. As soon as planted they should be watered; and if dry weather prevail the watering should be repeated every other day till the plants have got root.

The culture afterwards is, to keep them clear from weeds by hoeing the ground occasionally, and when they have advanced a little in growth to draw some earth with a hoe about their stems, which if repeated once or twice is of great advantage to the plants in promoting their growth.

In gathering them for use, attention must be had that the heads have attained their full growth, but which should be cut while they remain close, and before they begin to divide and assume a seedy-like appearance, and with about six inches of the main stalk to each head, as the upper part of the stalk eats exceeding sweet and tender; but which, previous to its

being dressed, must be peeled, or divested of the outer rind.

After gathering the main heads the stalks should be permitted to remain for the production of sprouts or smaller heads, which they afford plentifully, and which are as fine eating as the principal heads.

In saving the seeds of the different varieties, some of the largest and most perfect headed plants of each sort of the early crops should be selected, and managed in the same way as in the cabbage and cauliflower kinds, care being taken to keep the different varieties at as great a distance, and as distinct from each other as possible.

Culture in the Turnip kind.—There are different varieties of this root cultivated in the garden: but the Early Dutch is the best suited to the early and first general crops, and after it the Early Stone; and the Round White for a main summer crop. And for the autumn and winter crops, the White Round; the Green and Red-topped kinds are the most hardy.

The methods of raising all the sorts is by sowing the seeds in open situations, where the plants are to remain, as they do not admit of being transplanted with advantage.

The common season for sowing is any time from the beginning of March until the latter end of July; but to have a long and regular succession, it is necessary to make four or five different sowings at proper intervals, from the latter end of February till the middle of August.

The most proper soils for the culture of this root are those that are moderately light, as in strong land the roots frequently acquire a stringy texture and rankness of taste.

In garden culture the necessary space of ground to sow at a time for the supply of a family, is from about two to six, eight, or ten rods, according to circumstances, and the proper quantity of seed for each sowing may be from one to two or three ounces.

The ground should be prepared for the seed, by digging it over one spade deep, breaking the mould as fine as possible on the surface; the seed being sown, while the ground is fresh stirred, especially when the weather is hot or dry. A moist season for summer sowings is of great importance in this culture. The seed is mostly sown broadcast on the general surface, scattering it moderately thin with a regular cast, and even-spreading hand, raking it in evenly.

The plants appear in a few days after sowing, especially in moist weather; and in eight or ten weeks afterwards they are fit to draw.

It is of much advantage, when the weather

is hot, to steep the seed a few hours in water before it is sown; as by that means it germinates more quickly, and there is less danger of the plants being destroyed by the fly.

In the after-culture of the Turnip all that is requisite is, when the plants have two or three leaves, or are about a month old, to thin them out to six, eight, ten, or twelve inches distance, and clear them from weeds; which is effectually done by the hoe, and is best performed in dry weather.

At the same time the weeds should be removed and the surface well stirred over, as this proves highly beneficial to the growth of the crops.

The very early crops need not be thinned to more than five or six inches distance, especially if it is intended to begin drawing them as soon as they begin to turnip.

In three or four weeks after hoeing the plants will begin to turnip; and in five or six weeks, some be fit to draw young for use.

In the markets these roots are exposed clean-washed and neatly bunched up, in number from twelve to fifteen or eighteen, according to their size, in each bunch, and disposed of to the retailers by the dozen of bunches.

In saving the seed, some of the best roots of the autumn or winter crops should be permitted to stand where they were raised, to shoot up and produce seed, which should be collected, when fully ripened, by cutting off the stems from the bottom, and, after exposing them to the sun, thrashing it out.

BREAD-FRUIT-TREE. See *ARTOCARPUS*.

BROCOLI. See *BRASSICA*.

BROMELIA, a genus comprehending plants of the herbaceous perennial exotic kind for the hot-house. The Pine-Apple, &c.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronarieæ*.

The characters of which are: that the calyx is a three-cornered, small, superior, permanent perianthium; the divisions three and ovate: the corolla consists of three narrow-lanceolate erect petals, longer than the calyx: the nectary is fastened to each petal above the base, and converging: the stamina consist of six subulate filaments, shorter than the corolla, inserted into the receptacle: the anthers are erect and sagittate: the pistillum is an inferior germ: the style simple and filiform, the length of the stamens: the stigma obtuse and trifid: the pericarpium is a roundish berry, umbilicate, one- or three-celled: the seeds are numerous, incumbent, somewhat oblong, and obtuse.

The species chiefly cultivated for use and or-

namment are, 1. *B. Ananas*, Ananas, or Pine-Apple; 2. *B. Pinguin*, Pinguin, or Broad-leaved Wild Ananas; 3. *B. Karatas*, Karatas, or Upright Wild Ananas; 4. *B. lingulata*, Tongue-leaved Bromelia; 5. *B. nudicaulis*, Naked-stalked Bromelia.

The first is an herbaceous plant, which has a thick fibrous perennial root; the leaves being long, erect, narrow, sharp-pointed, and for the most part serrate on the edges, rising to the height of two or three feet, and somewhat resembling those of the aloe, only more thin and less succulent. The stem, which proceeds from the centre of them, is round, of strong growth, and supports the fruit near the top, which is erect, and mostly of an oval-oblong shape, being constituted of numerous tubercles, having above it a crown of leaves. The fruit, in its more young advancing growth, sends forth many small flowers of a blueish colour, proceeding singly from the knobs or tubercles. As these decline, the fruit begins to swell or increase in size, becoming fleshy and of a darkish-yellow colour, affording a highly fragrant smell. It is a fruit well known and highly esteemed on account of its delicious flavour. It is supposed to be a native of Africa, and is said to have been first raised in this climate by Sir Matthew Decker, at Richmond.

There are many varieties: but those of most importance for cultivation are, the Queen, the Sugar-loaf, the Montserrat, the King, the Smooth Pine, and the Green Pine. Other varieties are likewise known in cultivation: as the Black Antigua or Ripley; the Granada, with marbled leaves and very large fruit; the Bogwarp Pine, with broad green leaves; the Surinam Pine, with silver-striped leaves; with gold-striped leaves.

The first of the above varieties, or Queen Pine, is not so large as the Sugar-loaf, and the juice is more astringent; but it is in very general culture, and is said by Mr. Nicol to be more depended upon for a regular crop than any other.

The second sort, or Sugar-loaf Pine, is distinguished from the others by the leaves having purple stripes on the insides the whole length. The fruit is large, and when ripe inclines to straw colour. It is apt not to fruit in proper season.

The third, or Montserrat Pine, has the leaves of a dark-brown inclining to purple on the inside, and the knobs are rather long and flat. It is long in fruiting.

The King Pine is a large and very fine sort of fruit; but Mr. Nicol has found it to require less

water and more gravel in the mould and bottoms of the pots than other sorts.

The Smooth Pine is only cultivated for variety, the fruit being worth nothing.

The Green Pine is a scarce variety here, but is in high estimation in America: the fruit when well ripened is of an olive cast; therefore to have it green it must be cut early, when it is unfit for eating.

The Antigua Pine is large, and likewise of an excellent sort.

The second species has the leaves very thick about the root; and from the centre of these springs the stalk, which generally rises to the height of twelve or sixteen inches above the foliage, dividing into many little lateral branches, which bear so many single flowers. When the plant begins to shoot into blossom, all the leaves become of a fine scarlet colour towards the stalk, and continue so until the fruit begins to ripen; but it then begins to change, and afterwards fades gradually away. The fruits are separate, each nearly of the size of a walnut; the pulp has an agreeable sweetness, but joined with such a sharpness that, if it be suffered to lie any time in the mouth, it will corrode the palate and gums, so as to make the blood ooze out. From its having a tuft of leaves growing above the fruits, it has at first the appearance of the Pine-Apple; but the difference is obvious on examination, the fruits not being coadunate, as in that, but produced separately in clusters.

The third is an elegant plant, producing numerous radical leaves, which are of a subulate-linear shape, sharp-pointed, and edged with spines. The flowers are scentless, seated in the bosom or middle part of the plant, rose-coloured, with the calyx and germ downy. The length of the leaves in its native situation is six or seven feet. The fruits are oval, two or three hundred in number, and grow sessile in a heap or central group, surrounded by paleaceous expanded leaves or bractes; they contain a succulent whitish or yellowish flesh, under a coriaceous and yellowish bark. When ripe they are far from unpleasant, but in the unripe state they set the teeth on edge and excoriate the mouth. The economy of this plant in the preservation of its fruit to maturity is wonderful, being so protected by the spines of the surrounding leaves as to be secure from all injuries.

The fourth species has shorter leaves than the fifth, standing erect, narrow at the base, increasing in width gradually to the top, sharply serrate, and of a deep-green colour. The flower-

stem rises from the centre of the plant, dividing at top into several branches; the upper parts of these have close spikes of flowers, which come out alternately from the sides, each having a narrow entire leaf just below it, which is longer than the spike.

In the fifth, as well as in the preceding, the leaves are very like those of the Aloe, but not so thick and succulent; the edges are indented, and armed with strong black spines. The flower-stem is nearly three feet high; the lower part has entire leaves placed alternately at every joint; at the upper part are the flowers, set in a loose spike or thyse. These are succeeded by ovate seed-vessels, having a longitudinal partition, in the centre of which, on every side, are fastened smooth cylindrical seeds.

Culture.—The cultivation of the Pine is more difficult, and requires a more exact and nice attention in its management in this climate than that of almost any other plant. It is only capable of being effected, so as to afford good fruit, by the assistance of the stove of the hot-house with the artificial aid of fire heat. And, in order to accomplish the business with the greatest ease and convenience and in the most perfect manner, besides the stove of the hot- or fruiting-house, others are necessary for the purpose of bringing the plants forward in, till ready to set out in the fruiting-stove, which are termed nursery-stoves, or pits, and succession-stoves.

And where large quantities of such plants are cultivated, it is also useful to have what are called bark-pits, formed either by a deep frame of wood, or of brick-work, six feet in width with sufficient length, five or six feet deep behind, and four and a half in front, having the top glazed, to make bark or other hot-beds in, for the immediate reception of the crowns and suckers from the parent-plants, and for preventing the succession-stove from being crowded too much.

When the whole culture of these plants is to be effected in one stove only, the plants must be raised and fruited together; by which practice not above one half of the stove or the hot-house can be occupied at one time with fruiting plants: besides, the young plants are often liable to be brought forward too rapidly.

All these different stoves and nursing-pits should be provided with proper flues and fire-places, so contrived as to work steadily and save fuel as much as possible, as upon this the expense of the culture of the plants in a great measure depends. See HOT-HOUSE, STOVE, and BARK-PIT.

It is remarked by Mr. Nicol, that stoves for this use are variously constructed. Some are single pitted; some double; and some even triple; some have flues running under, and some round the bark-bed. These he considers as being very dangerous to the roots of the plants if over-heated. He also disapproves of double and triple stoves; as being very uneasy to work in stormy weather, and confining a vast quantity of stagnate unwholesome air in dull hazy weather. A stove in which there is a perfect command of fire heat, and which admits a free circulation of air in all parts, is to be preferred; and none are so convenient for this purpose as single ones.

The situations for them should be dry, and the bottoms or floors raised above the surface ground. The common practice of having borders for vines to be trained up the rafters, Mr. Nicol considers as highly prejudicial to the Pine plants.

Preparation of the Bark-beds.—The next circumstance of importance in the culture of these plants is that of forming the beds in the stoves and pits. These are differently constituted, with different cultivators, and are designed for the purpose of plunging the pots with the plants into, in order to their due growth and support. These beds are mostly composed of tanners' bark, as being a substance that not only affords the most uniform and durable heat, but which is the best suited to the nourishment and growth of the plants and fruit, as well as the most manageable. See BARK-BED.

The great desideratum in the making of these beds is that of producing such an uniform moderate bottom heat as may not injure the roots of the plants, while it is sufficient to promote their regular growth. The author of *The Scotch Forcing Gardener* observes, that his idea of the quantity and quality of bottom heat, that is required by the Pine, is different from that generally entertained. He never wishes the plants, except in striking suckers, to stand in a bottom heat higher than that of blood heat at any time, and that too of a mild moist nature. If the watch-stick, to the depth of the bottom of the pot, feels just a little warm, applied to the hand or the cheek, when the body is of a comfortable temperature, it is sufficient; and he thinks it consistent with reason, that the bottom and superficial heat should correspond at all times. In order more effectually to attain this, and that the roots may sustain no injury, he has recourse to the following rules in forming, turning, and trenching the beds. He never sifts the tan in the pit, or adds above an eighth

of new, which, if necessary, he gives place to by skimming off a little of the surface of the old. The new tan is never suffered to lie within a foot of the surface; by which means the pots are entirely plunged in the old. He lays the half of whatever quantity of new tan is added in the bottom of the trench, and divides the other equally to within a foot of the surface of the beds. In trenching the beds he throws the sides to the middle, and the middle to the sides, that there may be an equal mixture of the old tan. Thus they are rendered of a mild and equal temperature from the first, and continue much the same for three or four months; and, after the first filling, are attended with very little expense for new tan. It is obvious, therefore, that, in filling the pit of a new pinery, it should either be done several months before the plants are placed in it, or the tan should be well sweated and wasted by previous turning, in an open shed, &c. And in either case it is advisable not to plunge the pots above half their depth, for the first two or three months after filling.

In adding new tan, it should invariably be thrown up in a heap for eight or ten days before using, in order to drip and sweeten; and should never be applied fresh from the tan-yard; as it is wet, and apt to heat violently, as well as cake in the beds.

It is remarked that some object to tan as being expensive, and troublesome in working with; but, if this method is practised, these will be inconsiderable; and, as the plants require frequent shifting, the trouble of stirring up the bark-beds at such times is but trifling, the addition of new tan being sometimes unnecessary.

He is convinced that there is no ingredient which can be substituted for tan, that will equally answer the purpose in the pinery; and of course recommends the use of it in preference to all others, where it can be easily procured; and less or more of it is always indispensably necessary. He considers oak leaves as the next best material; but they cannot be had in many places. Where they are used, he advises that at least eighteen inches of well-reduced tan be laid on the surface, to plunge the pots in.

After these, a mixture of stable-dung and tree leaves of any kind is supposed the best. This should be well fermented before it is used, and at least two feet of reduced tan laid on the surface for the reception of the plants.

It is supposed by some that the reason of pines being planted in pots, instead of the surface of the beds, is the want of permanent heat in them,

as they may be removed with more facility in the time of renewing the bark, &c. But Mr. Nicol has a different opinion of the matter, as, if the heat of the bed were ever so permanent, he would grow them in pots; as all the different plants of any kind do not grow alike in their native climates, much less the pine in an artificial one. There is a necessity for having at least two compartments, and of growing the plants in pots; that they may be removed and classed, according to circumstances, with the greater ease and safety. Besides, many sorts of plants in any situation do much better in pots than otherwise; of these are all those of the succulent tribe, amongst which is the pine.

There would also seem another reason, which is the loose incoherent nature of tan, not affording a proper medium for the growth and support of such luxuriant plants.

The usual periods of forming and renovating or refreshing these beds, are in the beginning of the autumn, as in September, October, or the following month, that the heat may be well kept up during the winter, and in the spring, as about the beginning of April, a forking up being given in the interval between these periods; the pits in these cases being constantly well filled up, to allow for the settling that always takes place.

Mould proper for Potting the Plants.—The most suitable sort of earthy material for the culture of the Pine Apple plant in, is that of the pure vegetable kind, or some composition in which it is a principal ingredient, a large proportion of which should always be provided in a proper state for the purpose. The most beneficial kind is that which is obtained from the decayed leaves of the oak, or a mixture of it with that from those of ash, elm, beech, sycamore, &c. This mould is prepared by collecting the leaves as they fall in the autumn, and placing them in a heap, throwing a very little light mould over them to prevent their blowing away. They should remain in this state during the winter, and till the beginning of May, when they should be turned over and mixed well together. In this way, by the spring following, they will be reduced into a mould proper for use. This should however be sifted before it is employed, in order to remove pieces of sticks or other improper matters.

A compost of turfy vegetable mould with rich garden soil, and well rotted stable-dung from a hot-bed, in the proportion of one third of the latter, which has remained together for a considerable length of time, is likewise recommended by some.

Brown strong loamy earth well reduced by

long exposure to the weather is another useful material; pigeon-dung that has been at least two years in a heap, and frequently turned and exposed to the influence of the weather, may also be employed. Also shell marle; and sea or river gravel, which has been sifted and kept in a dry place, having the size of large peas.

The proportions in which they are advised to be made use of for different purposes in the culture of these plants, by Mr. Nicol, are these: for crowns and suckers, entire vegetable mould, with a little gravel at bottom, to strike in; afterwards three fourths vegetable mould, one fourth loam, mixed with about a twentieth part gravel, and a little entire gravel at bottom, till a year old. For year olds, and till shifted into fruiting pots,—one half vegetable mould, one half loam; to which should be added about a twentieth part gravel, and as much shell marle, with a little gravel at bottom, as above. For fruiting in, one half loam, a fourth vegetable mould, a fourth pigeon-dung, to which should be added gravel and marle as above, laying two inches of entire gravel at bottom.

Raising the Plants.—This is the next point of consequence in the cultivation of this fruit; and which is effected by the crowns produced on the tops of the fruit, the off-sets or suckers from between the leaves, and the roots of the old plants. The last should never be employed where it can be avoided. Of the other two, suckers are preferred by some, while crowns have the advantage according to others; but Mr. Nicol justly remarks, that if the former have the superiority in being the stronger plants, they have likewise the disadvantage of running to fruit more unseasonably than the latter.

The crowns are procured by twisting them from off the fruit when it is made use of; and the suckers by breaking down the leaf immediately beneath them, and moving them gently both ways till they come off; which should not be attempted till the under parts appear of a brown colour, and ripe, as under other circumstances they are liable to break in the middle and be spoiled. When taken off, they should each of them be cleared of a few of the lower outward leaves about the bottoms, where they are to form roots, by rubbing them off, and some pare the under part of the stumps smooth with a knife. They are then laid or hung up in a dry place four or five days, or more, that the over moisture and wounds in the stumps or thick parts of the plants may be dried up sufficiently and healed over before they are planted, and the danger of their rotting be prevented.

The author of the *Scotch Forcing Gardener*, however, observes, that if they are perfectly ripe,

and the old plants have not had any water for a week or two before they were taken off (which they ought not), nothing of this kind is necessary. Each plant frequently affords many suckers, but rarely more than one crown. The crowns are usually gathered one by one, as the fruit is used, and stuck into the bark-beds till the whole crop of them, as well as suckers, can be potted together.

The plants, after being thus prepared and collected, must be placed, according to their sizes, singly in pots of three or four inches diameter, and five or six deep, provided for the purpose, and filled with entire vegetable mould, as above, having the bottoms previously laid with clean gravel, of the size of horse-beans, to the thickness of an inch or something more. Some, however, only advise a piece of shell or tile to be put over the hole. The first is probably the best method, as preventing the water the most effectually from stagnating about the roots of the plants. In planting they should neither be put in too shallow or to too great a depth, but have the mould pretty closely pressed round them.

The nursing-pit should be prepared for their reception, by having new tan, to the extent of a fifth or sixth part added, but none suffered to lie within ten or twelve inches of the surface. In these beds, when of a due heat, the pots should be plunged quite to the brims, in regular order, at the distance of two or three inches pot from pot each way, keeping them perfectly level, and the largest towards the back parts. Some advise a slight watering to be immediately given; but others think that neither the crowns nor suckers should have any for the first fortnight after planting, nor any over head the first winter, lest they should be injured in their hearts by the damp which it occasions.

As the plants thus raised only produce fruit once, as in the second, or more generally in the third year's growth, commonly with suckers and crowns for future increase, and become afterwards of no use but as stools for supplying a few more suckers, there is obviously a necessity for raising fresh supplies of plants annually.

Culture in the Nursing-stoves.—The management of the plants, the first year, or while they remain in the nursery-stoves or pits, requires much attention to keep them in a regular and healthy growth, by preserving a continued proper degree of heat in the beds, and a judicious application of water, with a suitable admission of free air. Mr. Nicol observes, that when the plants have been struck in the beginning of September, the beds will mostly continue of a kindly heat till about the middle of November;

but should then be wrought over, introducing about an eighth part of new tan by trenching it in. But though the plants will in general have made good roots by this period, they do not in common stand in need of being fresh potted; such only as are in any degree matted in the roots, being put into other pots of the next size to those in which they are growing. The matted part being simply taken off, they should be replaced with the balls as entire as possible.

They are then to be plunged in the beds, as in the former case, quite up to the brims of the pots, and should remain till the beginning of March; at which period the beds should be again wrought over as directed above, and the plants have the mould wholly shaken from their roots; after which they should be replaced in the same pots with fresh mould, and replunged in the beds. In this case the roots, being fresh, should not be disturbed; the parts that are decayed in the stumps or other places only being removed.

As the heat of the beds without the aid of fire will not be sufficient during these periods for the healthy growth of the plants, it will be requisite to have recourse to that of the artificial kind. This should be applied about the beginning of October, or the following month, according to the state of the season. In the application of this heat, great care should be had to keep it so moderate as not to force the plants forward too much, and render them in danger of fruiting unseasonably, while it is sufficient for their perfect growth. The former is shown by their drawing up with long leaves and white hearts, and the latter by the want of the proper healthy aspect. To accomplish this in the most certain manner, Mr. Nicol recommends working the stoves so as to keep the thermometer as near as possible to 65°, at seven or eight o'clock in the morning, and nine at night, until about the first of March, and then to increase it gradually to 70°; at which it should be maintained so long as artificial heat may be required.

When the weather is very severe it is likewise necessary to cover and defend the glasses in the night-time, as well as occasionally in the day, with canvass for the purpose, or cloths fixed with rollers and pulleys, or large garden mats.

At the above period the plants usually begin to grow in a vigorous and rapid manner, and require potting again about the first or middle of May; at which time the bed should be stirred up to about half its depth, and, if necessary, a very little new tan worked in. The plants should now be put into pots of about six inches in diameter on the inside at the tops on a

medium, according to their sizes, with the balls entire; and if any of them are matted, that part should be displaced; plunging them to the brim, at the distance of about fifteen inches from centre to centre of the plants in the largest kinds, and a foot in the smaller ones, giving a slight watering at the time.

Another potting becomes necessary about the beginning of August; and where there are three compartments, the plants should now be removed into the succession-house, the bark-bed being worked to the bottom. The plants must be put into pots of eight inches diameter, plunging them to the brims at the distance of sixteen inches on a medium, settling them with a gentle watering.

At these periods a more free admission of fresh air becomes necessary, especially when the weather is mild and favourable.

Where succession-stoves are employed in the culture of these plants, they are capable of being much more conveniently managed in their growth the second year.

Culture in the Succession-Stoves or Pits.—In the second year's growth of these plants, it will be necessary, towards the middle of November, to work the bark-beds over to last during the winter, but the plants need not be shifted; the decayed leaves about their bottoms being only twisted off, and a little fresh mould laid on the surface of the pots, when it may be requisite, replunging them to the brims as before. Some advise the leaves of the plants to be tied up while they are potting or removing, in order to keep them from being bruised; but Mr. Nicol disapproves of the practice, as he finds they are generally much more bruised in the tying than when left loose. His method is, to have a person standing opposite him in the time of potting, which is performed on a stage about a yard high, whose business is to hold up the leaves in a loose though regular manner between the arms, and prepare and hand the pots, while another hands and sets aside the plants. In this manner he has often been able to shift a hundred one-year old plants in two hours. In conveying the plants through the doors of the stoves, the person should proceed with the back foremost, by which the leaves are saved from injury, as the pot goes first, and the leaves are drawn backwards after it.

About the beginning of March, the plants again require shifting, and the bark-beds should then be trenched as before. The plants at this time must be shaken out, and replaced in the same pots, in entire new mould, cutting off any decayed roots, or the ends of the stumps, and twisting off a few of the bottom leaves, &c. re-

plunging them as before in the beds, and giving them a slight watering.

Towards the first of June the plants should be shifted again; the bark-beds being wrought over to about half their depths, and a little fresh tan added when necessary; the plants, with their balls entire, being then placed into pots of about ten inches diameter, plunging them at the distance of eighteen inches from centre to centre into the beds, and with a little water settling them.

In regard to potting, Mr. Nicol remarks, that at all times a few of the bottom leaves should be twisted off each plant, that fresh roots may be made more readily to furnish the surface, which tends to keep them more steady in the pots.

The fire-heat in these cases should be begun about the same period as before, according to Mr. Nicol, and kept to about 60 degrees of the thermometer till the beginning of March, and then gradually increased to 65° for the remainder of the season.

The plants should be refreshed occasionally with a little water, according as the earth in the pots becomes dry, or as the state of the weather demands. They should likewise have a more free admission of fresh air whenever the season will admit of it without danger.

Culture in the Fruiting-Stove or Hot-house.—The plants raised in the nursery-pits, and continued in their growth in the succession-stoves, having attained a proper size and strength, should, towards the latter end of August, or the beginning of the following month, be placed in the pots in which they are to fruit in the same manner as before, and deposited in the stoves of the hot-house, which should have the bark-beds prepared for their reception, by trenching them to the bottom, and adding about a tenth part of new tan in a proper state of preparation for the purpose, being well blended, and made so as to fill up the pits well.

The pots in which the plants are now put should be about a foot in diameter, which should be plunged in the beds to the brims; a gentle watering being immediately given. In potting the plants, Mr. Nicol, in these cases, advises the use of a small stick to trundle the mould down between the balls and the sides of the pots, so as to leave no cavities; a circumstance which should be attended to at all times, as being of great utility.

The management in this state differs but little from that of the preceding: the chief circumstance is that of keeping up the heat in as regular a manner as possible, with the addition of a due degree of refreshing moisture and free air.

The beds should, about the middle of November, be stirred to half their depths, and a little tan be added: but the plants must not be shifted at this period; they only require to be replunged to the brims again in the beds for the winter. It is the common practice at this time, to add a large quantity of new tan, in order to keep up a strong bottom heat through this season; than which, Mr. Nicol thinks, nothing can be more erroneous. He has already remarked that the bottom and superficial heat ought to correspond at all times; and if the house is to be wrought to 60° only for the winter, it follows, he supposes, that a very moderate bottom heat is sufficient. The temperature of the house being so much reduced in winter is, he conceives, to prevent the plants from starting too soon into fruit; and their doing so is frequently more in consequence of too much bottom heat, than irregularity in the temperature of the stove.

In the beginning of February, which is the best showing season, the bark-beds will require trenching; which is the only time of the year that Mr. Nicol advises a deviation from the rules given above. From this time, the house in his opinion should be wrought as high as 70°, and the bottom heat keep regular pace with the superficial; for which new tan to the extent of a sixth part should be added. Such of the plants, he observes, as are not *shown*, are healthy at the root; and stand erect and firm in the pots, should have a little fresh mould laid on the surface, by the removal of about two inches of the old. But those that are already shown, and those that are anywise unhealthy, or appear stunted, should be shaken out entirely, and replaced with fresh mould in the same pots; but none of the roots, unless wasted, should be cut away or removed. This, so far as it respects the plants that are shown, he presumes has not hitherto been recommended; he is consequently happy in being enabled to do it with confidence, as it has ever been a matter to be regretted, that pines, from the want of sun and air in the winter months, are apt to be stunted, and show their fruit too soon; and that fruit so shown, seldom comes to be of any considerable size or flavour; the plants so stunted being unable to nourish the fruit; and this, from the want of sunshine in the early months, coming far short in flavour to that matured at a later period.

It is added that the experiment was tried on a dozen of plants; the half of which were in, and the other half past the flower, at this time of the year. The result was, that they were kept back a full month by the operation; those that were past the flower equalled, and those

that were only in flower considerably exceeded, any of the others of their own forwardness at the time of shifting. Being encouraged by this success, the author treated his whole stock of fruiting plants in the same manner the following season, and they were kept back to a better season, and swelled their fruit to as good a size as those that showed in February.

Towards the beginning or middle of May, the bark-beds should be again trenched to the bottom, a tenth part of new tan added, and the plants replunged in the beds in the same manner as in the preceding cases, nothing further being necessary.

Though it is not possible to apply the heat constantly with that degree of exactness that has been recommended, it is of great importance to approach it as much as can be conveniently done; which, by proper attention to the thermometers employed for the purpose, may in a great measure be accomplished, especially where the person who manages the fires has likewise the command of the house, which should always be the case.

Several sorts of fuel are employed; but coal or coal cinders make the most regular and durable fires, where they can be obtained. Ground peat and turf may also be employed where the fire-places are properly constructed for the purpose. See *Hothouse*.

In order to preserve a due temperature when the winter season proves very severe, occasional coverings may be necessary to be applied over the glass frames of the houses in the manner that has been already recommended.

With regard to the admission of air, the author of the *Scotch Forcing Gardener* recommends very large portions to the fruiting-house while the fruit is ripening; it is, as he thinks, not only essential to the flavouring of it, but highly conducive to the ripening and hardening of the suckers, which is also a point of importance.

It is advised that in winter, even frosty air should be admitted in a moderate degree at the top of the house; and in fresh weather, at this season, to the extent that the thermometer may not be more than 5 degrees above the fire heat medium, being continued till the middle of March; after which, and for the whole season, not more than 10 degrees. It is observed that in winter fires are frequently made in the morning, solely for the purpose of admitting air, and at the same time keeping up the temperature of the house; and that "although the pine from its nature does not appear to quickly feel the effects of bad management, there are few plants in reality do it more so; and too due

an attention to the temperature of the house, especially in winter, cannot be paid, the want of which is sure to throw the plants into fruit at an untimely season."

Though it is the practice of some to shade their plants from the sun, the above author supposes they can never have too much of its influence.

In respect to the application of water in the culture of these plants, it is advised to be given very sparingly in dull weather, particularly in the winter season. From about the beginning of October to the first or middle of March, once in eight or ten days is generally sufficient, in a small proportion; but from March to October, plentiful waterings are requisite in considerable quantities at a time, mostly once in three or four days. Watering much over head in winter is not advised, except in clear weather. But, in the summer months it is recommended as a good practice, to first give the quantity requisite to the root, from the spout of the watering-pan; and then a sufficient quantity to wet every part of the leaves from the rose. The reason of which is, that different kinds of pines are found to require very different quantities of water: "the Queen requiring a third more than the King, Antigua, or Brown Sugar Loaf; and the Montserrat and Green or Striped Sugar Loaf, a medium between the two," with "plants in an equal state of health and size."

With the fruiting plants, very large quantities are required from the time they are out of flower till they begin to colour; but which should then be gradually withheld, and, towards their maturity, totally; as this increases the flavour of the fruit, and perfects the ripening of the suckers.

Soft water well impregnated with air should be used at all times, which should be applied either about eight o'clock in the morning, or from four to five in the afternoon.

Steaming is considered by Mr. Nicol as not only useless to the health of the pine, but in hazy, dull weather in winter prejudicial; of course, when there are grapes in the stove, it should be regulated so as to suit them.

In the watering of these plants, a tin pipe is recommended as useful and convenient, for the more ready conducting the water, in the quantity intended, to any particular plant in any part of the bark-beds. It should be about six feet long, an inch and half in diameter at the upper end, and at the other about half an inch, and be formed of two or three separate pieces, to lengthen or shorten at pleasure: at the largest end, a kind of funnel should either be fixed, or so contrived as to take off and on

occasionally, to receive the water from the watering-pot. By this means water is capable of being conveyed to the plants separately in any proportion without any being poured into the hearts of them, and without wetting the bark-beds more than is necessary to moisten the earth in the pots, &c. It is particularly applicable in winter, as well as in the spring, during the bloom of the fruiting plants.

In winter it may sometimes be proper to have some convenience in the stove to preserve water in, that it may be raised in its heat a little, previous to watering the plants with it.

The application of steam has lately been attempted in the raising of this sort of fruit, and, from the trials of Mr. Bastard, with considerable success; as, from his statements detailed in the 67th vol. of the Philosophical Transactions, it would seem that both the size and flavour of the fruit were greatly increased by placing the plants in their pots in shallow pans kept constantly filled with water on shelves, so as nearly to touch the glass on the back side of the hothouse, where the heat is constantly the greatest. The same effects have likewise been produced by setting them in leaden cisterns placed over the back flues of hothouses. It is, however, remarked by the author of the Philosophy of Gardening, that the use of the steam of boiling water in this way requires much attention. It is usually conveyed through small apertures which pass through a brick arch, somewhat in the manner of the floor of the malt-kiln, where the water boils beneath the beds of bark, being occasionally admitted into the room above, supplying in this way heat and moisture to the beds as well as the air of the house. See *STEAM* and *HOthouse*.

Some have attempted the culture of the pineapple without the assistance of hot-houses and stoves constructed for the purpose, simply by means of common deep garden frames, and dung hot-beds aided by occasional linings, in order to promote and keep up a regular degree of heat; but this is a very imperfect method, and seldom attended with much success.

The injuries which these plants are exposed to during their growth, are chiefly from brown and white scaly insects of the *coccus* tribe, and the ant. But, as the last is seldom seen if the former are not present, Mr. Nicol concludes that their presence is in consequence of that of the *coccus*, on which they seem to feed. And the brown scaled insect is conceived to be no further injurious to the plants, than by dirtying them. But the *white scaled*, or *bug*, is of the most mischievous nature to the plants, as where it abounds they never succeed well.

In order to remove them, Mr. Nicol found the

following method answer perfectly in a case where the plants were greatly affected. Having prepared a strong heat for the plants in the bark-bed of the nursing-pit, he shook the plants out of the pots, and cut every fibre from their roots, (whereby they were rendered the same as suckers at first,) not excepting those that were in fruit, some of which were just in flower; dipped them into a liquor, prepared by boiling two pounds of soft soap and flowers of sulphur, with one pound of roll tobacco, and two ounces of nux vomica, in eight gallons of water to six, and then put them into pots of six inches diameter, and plunged them to the brim, keeping up a fire heat to about 75 degrees; gave them but little air, shading them in sunshine; and afterwards afforded them plentiful waterings over head, with the same mixture reduced to about half its former strength. He continued this treatment for two whole months; at the end of which he again shook out their roots, and washed the whole plants in pure water; put them into fresh pots of eight inches diameter, and re-plunged them into a kindly heat in another nursing pit, treating them in all respects as any other plants. He never saw a vestige of the bug afterwards. A few of those plants that were *shown*, however, died; but the others, he observes, produced such fruit as might be expected from plants of such sizes of any other kind.

Time of Maturation and Cutting the Fruit.—

The common season for the ripening of this sort of fruit is from June till September, but from August to the end of the latter of these months is the principal period of their becoming in the greatest perfection. Mr. Nicol remarks that the plants in some kinds put forth suckers at the base of the fruit; which should be rubbed off as they appear. Others put forth suckers from the root; and, as these are not proper to be taken into the stock, they should also be twisted off, or otherwise destroyed, as they appear. It is added, that if a plant were to be divested of all its suckers, the fruit would grow to a much larger size in consequence; but, as this would ultimately tend to the extirpation of the whole stock, it is by no means advisable. It is proper, however, to reduce the number of suckers on the plant to two or three at most, which should be done in the May shifting; and as the suckers are about half grown at that time, the cultivator is enabled to choose the best, and at the same time to easily destroy the others by breaking out their hearts. Where the increase of the stock is the object, all suckers, even of the roots, should be encouraged in their growth.

As some of the kinds also grow on long foot-stalks, which are apt to bend down as the fruit gets heavy, they should be supported by small stakes, or other means, as, when the fruit falls over, the stalks are liable to be bruised, and the nourishment of the fruit retarded.

This sort of fruit loses much of its flavour when suffered to grow till fully ripe, where not prevented: it should therefore always be cut by the time it has attained a greenish-yellow colour; and either left in the heart of the old plant, or laid on the wall plate, &c. in the stove, for a few days after it has been separated from the stem.

The signs of the fruit having attained perfection, in most of the kinds, are, those of its assuming a fine golden colour with a delightfully fragrant smell, at which time it should always be removed; the method of performing which is, by leaving several inches of the stem with it, and all the crown of leaves at the top. It is eaten in the most perfection soon after being cut; but, when requisite, may be preserved in good order for several weeks, by putting the stem into a bottle of pure water, renewed every two or three days, and placing it in a well-aired room, at about 60 degrees of heat.

The culture in the other species may be effected either by sowing the seeds obtained from abroad in the autumn or spring months, in pots plunged in the hot-beds of the stove, or by means of suckers in the manner of the pineapple.

They should be kept constantly in the stove, where they afford much variety.

BROOM. See **GENISTA**.

BROOM, African. See **ASPALATHUS**.

BROOM, Garden, a collection of the small twigs or other parts of birch, broom, heath, or other similar trees or plants, bound up tight together, having a stem or handle introduced in the middle. The best sort for this use are those formed of birch, which should neither be too stiff nor too large. Brooms are constantly in use, especially during the spring, summer, and autumnal seasons, for keeping walks, plats of short or mown grass, and other parts of ornamented grounds, perfectly clean. Those intended for sweeping up cut grass or leaves should be more slender and less bulky than such as are employed on gravel or other walks. In all cases the materials should be fresh, and very firmly tied up together.

BROWALLIA, a genus comprising plants of the tender annual stove-kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Luridæ*.

The characters of which are: that the calyx is a one-leafed, tubular, short, five-toothed, permanent perianthium: the toothlets a little unequal: the corolla is monopetalous, funnel-form: the tube cylindric, twice as long as the calyx: the border flat, equal, and five-cleft: the divisions rounded and emarginate; the upper somewhat large, constituting the upper lip; the four others equal: the stamina consist of four filaments in the throat of the corolla; the two upper shortest; the lower broader and higher, coloured, reflex, closing the throat of the corolla: the anthers are simple, bent in, and converging; the inner ones twin, the outer opening at the top with a little hole, and closing the throat of the corolla: the pistillum an ovate retuse germ: the style filiform, the length of the tube of the corolla: the stigma is thick and four-lobed: the pericarpium is an ovate, obtuse, one-celled capsule, covered, bursting into four parts at the top: the partition thin and parallel: the seeds numerous and small: the receptacle nearly columnar and compressed.

The species are, 1. *B. demissa*, Spreading Browallia; 2. *B. elata*, Upright Browallia.

The first usually grows about two feet high, and spreads out into lateral branches, with oval entire leaves, ending in a point, and on short petioles. Towards the end of the branches the flowers are produced singly upon long axillary peduncles. The corolla is crooked and bent downward; the top of the tube is spread open, and the brim has some resemblance to a labiate flower. It is of a bright but pale-blue colour, sometimes inclining to a purple or red; and often there are flowers of three colours on the same plant.

The second species rises about the same height as the first, but has stronger stalks, and sends out a greater number of branches; it is therefore much more bushy. The flowers are produced on axillary peduncles, some sustaining one, others three or more flowers, of a dark-blue colour. But, according to Mr. Curtis, it is a much taller plant than the above, and justice cannot be done to the brilliancy of the corolla by any colours we have. It is a native of Peru, and flowers from July to September.

Culture.—These plants may be raised annually by sowing the seeds on a moderate hot-bed, in the spring season; and when the plants are of sufficient growth they may be removed into separate pots, filled with good mould, and plunged in the stove, water being occasionally given. They flower the most part of the summer, and afford ripe seed.

They are very ornamental plants, especially

the latter species, and afford variety in the greenhouse.

BRUNIA, a genus containing a plant of the shrubby exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are : that the calyx is a common, roundish, imbricate, many-flowered perianthium : the leaflets ovate-oblong. Proper five-leaved, inferior : leaflets oblong, and villose : the corolla consists of five petals : claws slender : borders roundish, and spreading : the stamina consist of five capillary filaments, inserted into the claws of the petals : the anthers are ovate-oblong : the pistillum is a very small, superior germ : the style simple and cylindric : the stigma obtuse : there is no pericarpium : the seeds solitary : the receptacle common and hairy.

The species is the *B. lanuginosa*, Heath-leaved Brunia.

It has the stem rising about a foot in height and shrubby. The leaves are linear-filiform, smooth and short, with black tips. The flowers are white, and produced in heads. It is a native of the Cape.

Culture.—It may be increased by cuttings or slips made from the young branches or shoots, which should be planted out in pots of rich earth, and plunged in a hot-bed, a little water being frequently given. After the plants have stricken good root, they should be removed into separate pots to undergo the ordinary culture of other green-house plants.

BRUNSFELSIA, a genus comprehending a plant of the shrubby exotic sort.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are : that the calyx is a one-leaved, bell-shaped, five-toothed, very obtuse, small, permanent perianthium : the corolla is one-petalled, funnel-form : the tube very long, slightly curved inwards : the border is flat, five-cleft and blunt : the stamina consist of four very short filaments : the anthers are oblong and upright ; two a little higher than the others, prominent from the mouth of the tube : the pistillum is a roundish small germ, the style filiform, the length of the tube : the stigma is thickish : the pericarpium is a capsule, berried on the outside, globular, one-celled, two-valved : the seeds are very many, compressed, convex on one side, angular on the other, rugged with dots : the receptacle is fastened to the bottom of the capsule, chaffy : the chaffs coadunate, subulate at the tip, separating the seeds.

The species is the *B. Americana*, American Brunfelsia.

It rises to the height of from five or six to eight, ten, or more feet, with a smooth even trunk and loose branches : the leaves are alternate, entire, smooth, somewhat shining ; on cylindric, short petioles, somewhat reflex : the flowers axillary and terminating, peduncled, produced three or four together : the corolla yellow, turning white, very sweet-scented, having a tube four or five inches in length : the anthers are globular, and bifid : those of the upper filaments, together with the stigma, close up the aperture of the tube : the fruit is green, with a red conceptacle. It is a native of Jamaica, and known by the title of Trumpet Flower.

Culture.—These plants are capable of being increased, either by seeds or cuttings, which should be sown or set in pots of fresh light earth in the spring, and plunged in the bark hot-bed, watering them as may be necessary. When the plants have attained sufficient growth, they should be removed into other pots of the same earth, and replaced in the hot-bed, water and shade being given till they become well rooted, when free air should be admitted. In their more advanced growth, they may be removed into the bark-stove, and have free air during summer, but should be well protected in the winter. These plants afford variety in the stove.

BUBON, a genus containing plants of the shrubby tender kind for the green-house.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

Its characters are : that the calyx is an universal umbel, of about ten rays, the middle ones shorter : partial of fifteen to twenty rays : involucre universal, five-leaved : the leaflets lanceolate-acuminate, patulous, equal, much shorter than the umbel, and permanent : partial with rather more leaflets, of the same shape, the length of the umbellule : the perianth proper five-toothed, very small and permanent : the corolla universal uniform : all the floscules fertile. Proper of five, lanceolate, inflex petals : the stamina consist of five simple filaments, the length of the corollule : the anthers are simple : the pistillum is an ovate, inferior germ : the styles two, setaceous, permanent, hardly the length of the corollule, spreading and reflex : the stigmas are obtuse : no pericarpium : the fruit ovate, striated, villose, bipartite, and crowned : the seeds two, ovate, flat on one side and convex on the other, striated and villose.

The species cultivated are ; 1. *B. Galbanum*, Lovage-leaved Shrubby Bubon. 2. *B. gum-miferum*, Gum-bearing Shrubby Bubon.

The first species rises with an upright stalk to the height of eight or ten feet, which at bottom is ligneous, having a purplish bark, covered with a whitish powder, which comes off when handled; the upper part of the stalk is garnished with leaves at every joint, the foot-stalks half embracing them at their base, branching out into several smaller, like those of the common parsley, and set with leaves like those of lovage, but smaller, of a gray colour; the top of the stalk is terminated by an umbel of yellow flowers, which are succeeded by oblong channelled seeds, having a thin membrane or wing on their border. It flowers in August, but does not produce seeds in this climate. When any part of the plant is wounded, there issues a little thin cream-coloured milk, which is the drug galbanum. It is a native of the Cape.

The second rises with a woody stalk about two feet high, with leaves at each joint branching out like those of the former; but the leaflets are narrow and indented, like those of bastard hemlock. The stalk is terminated by a large umbel of small white flowers, which are succeeded by seeds as in the former sort. It is a native of the Cape, and flowers in July.

Culture.—These plants are propagated by seeds, which should be sown in pots filled with light loamy earth, as soon as they are procured, which if in autumn, they should be plunged into a bed of tanner's bark, where the heat is nearly gone, and be screened from frost in winter. The plants come up in the spring, and about the middle of April are fit to remove, when they should be carefully shaken out of the pots, and be planted each into a separate small pot, filled with the same sort of earth, then plunged into the tan again, water being given to settle the earth to the roots, as well as shade in the daytime, until they have taken new root. They must then be gradually inured to the open air, into which they should be removed in June, being placed in sheltered situations where they may remain till autumn, when they must be taken into the green-house, and be exposed to the sun and air as much as possible, but defended from frost.

In winter they should have but little water, as much wet injures them; but in summer, when exposed to the open air, they must be frequently refreshed with water in dry weather.

These plants afford variety in the green-house in winter, and, when placed out in summer with other green-house plants, have a good effect, especially when grown to a good size. They mostly flower the third year from seeds, but their flowers are produced so late in summer, that the seeds seldom form before the cold

comes on: in warm summers, however, the second sort will perfect seeds, if it stand in a warm sheltered situation.

BUCKNERA, a genus containing a plant of the exotic shrubby kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatae*.

Its characters are: that it is a one-leaved, obscurely five-toothed, scabrous, permanent perianthium: the corolla is monopetalous: tube very long, filiform, bowed, border flat, short, five-cleft, equal: the two upper divisions very short, reflex; the three lower cordate, nearly equal: the stamina consist of four filaments, very short, in the throat of the corolla; the two upper ones prominent outward, and short: the anthers are oblong and obtuse: the pistillum is an ovate-oblong germ: the style filiform, the length of the tube: the stigma obtuse: the pericarpium is an acuminate capsule, covered, two-celled, gaping at the top into two parts: partition contrary: the seeds are numerous and angular: the receptacle is fastened to the middle of the partition.

There is only one species for our use, *B. viscosa*, Clammy Bucknera.

It rises with a shrubby upright branching stalk, with slightly indented, linear, spear-shaped leaves. The flowers are purple with a yellow eye. It has not much beauty, but occupies little room, and flowers during most of the summer months. It was found at the Cape.

Culture.—This plant may be readily increased by setting cuttings from the young shoots in summer, in pots of light mould, care being taken to water and shade them well till they have stricken roots, and become well established; when they should be removed into other pots separately, and be protected during the winter season in the green-house.

BUD, the eye or spot whence a branch is sent off in trees or plants. It is the *hybernaculum* or winter-cradle of the embryon shoot, being mostly covered by scaly laminæ, and sometimes a resinous varnish, that serves to protect it during the winter from the effects of cold and moisture, as well as the attacks of insects. They are either leaf-buds or flower-buds, or both in the same covering. These embryos have been denominated the "viviparous progeny of plants," by Doctor Darwin, in contradistinction to those from seeds, which he has termed "oviparous progeny."

The bud, according to Doctor Hooper, at first lies concealed in the body of the tree or branch between the barks, being very small, and covered with the bark in the same way as

the seed. It afterwards sends out small delicate vessels that insensate with those of the trunk, and absorb from them the sap-juice which is conveyed to every part for its nutrition. And after having attained a determinate size in this situation, it penetrates and forces itself through the coverings into the air, which at first are pushed before it so as to swell out, and soon afterwards torn asunder; when it unfolds itself, exhibiting in a short time the perfect plant in miniature, but deriving its nourishment from the tree, till forced or cut off, and planted in the soil. Buds, by being inserted into or ingrafted on the stems or branches of other trees, or by being planted in the earth, become plants similar to those from which they were taken.

Each bud of most of the deciduous trees in this climate, may, it is supposed by the author of the *Philosophy of Gardening*, be considered as an individual biennial plant, with as much distinctness as a seed; as "the bud like the seed is formed in one summer, grows to maturity in the next, and then dies." Yet that in some trees in this climate, such "as the mock orange, philadelphus, acacia, viburnum; and in the evergreen shrubs, such as holly, laurel, vinca, heath and rue," as well as "in all those herbs commonly called annuals; and in most of the trees of warmer climates, the buds appear to be formed in the vernal months, and to arrive at their maturity during the same year, and may therefore be properly called annual plants." It is likewise further contended, that "the bud of those herbs usually termed annuals, rises in the bosom of a leaf; and, as it adheres to its parent, requires no female apparatus to nourish it, but gradually strikes down roots from its caudex into the ground, which caudex forms a part of the bark of the increasing plant." This is supposed to be exemplified in those herbaceous vegetables that have just risen from seeds; the buds of which being in reality individual annual plants, that "grow to maturity adhering to the parent," and do not consequently, from there being no reservoir of nutriment laid up for them, resemble a seed or egg: the same thing is also supposed to happen to the evergreen shrubs and trees of this climate, such as heath, rue, box, pine, and laurel, as in these vegetables, from the leaf not being destroyed in the autumn, it continues to oxygenate the juice, and supply nourishment to the bud in its bosom in the fine days in the winter and spring seasons, surviving till nearly the middle of summer, or when the new bud has expanded a leaf of its own. Hence it is ingeniously conjectured that such evergreens make no reserve of nutriment,

in the summer, in their roots or albumen, for the support of their ensuing vernal buds, and consequently have perhaps no bleeding season, as in trees of the deciduous kind.

The embryo in a bud of a plant of the deciduous kind, however, leaves its hybernaculum in the spring season, in the same manner as the embryo in a seed, or the chick in the egg; and, as in these, the young plants in different vegetables have previously attained different states of maturity, as has been observed by M. Ferber in many instances.

But in the buds in many other trees, and in all the backward buds formed late in summer on the lower parts of branches much excluded from light and air, the embryo is not forward enough to be readily perceived; and in those deciduous trees or shrubs in this climate, that have no discernible buds in winter, such as the mock orange, viburnum, and various others, it is suspected that there is an embryo secreted from the juice of the plant at the foot-stalk of each leaf, but which is not so forward as to protrude through the bark and exhibit a prominent bud. The same is conceived to be the case with such trees in warm climates as lose their leaves in winter, in which they are believed not to produce buds in autumn, as it cannot be supposed how fresh leaf-buds can be produced in the vernal months, when the leaves or lungs of the full grown living part of the tree are destroyed, and the last year's buds along with them. But if the caudex of the new bud be generated without the plumula, or visible bud, it is certainly capable of affording a plumula for itself in the spring, as is exemplified in the production of new buds, or a branch being cut off, on the sides of the remaining trunk, as is often the case in trees of the willow kind.

In regard to the growth of the new bud, it is observed "that the pith is of great consequence to it, as is shown by gradually slicing a shoot of horse-chesnut in autumn or the early spring. The rudiments of the seven separate ribs of the late parent leaf, and the central pith of the bud in its bosom, are seen to arise or terminate near the pith of the parent shoot, where the embryon plumula is probably secreted by a gland at the bottom of the parent leaf-stalk, finds there its first reception and nourishment, and is gradually protruded and elongated by the pith which exists in its centre, as the bud proceeds, and thus constitutes the ascending caudex of the new bud; which is resembled by the wires of strawberries, and other creeping vegetables; whereas the descending caudexes of the new buds, which form the filaments of the bark of trees, are secreted from the various parts of the old

bark in their vicinity." The pith is therefore considered as the first or most essential rudiment of the new plant; like the brain or spinal marrow in animals.

In such plants as have hollow stems, the central cavities, though not filled with pith, are supposed to be lined with it; and in some this is not only the case, but, whenever a new bud is formed on the summit of the ascending stem, or in the bosom of a leaf, a membrane covered with this substance divides the cavity, which distinguishes one bud from another. And in slicing away that part of the stem of others where the new lateral bud adheres, the pith in the centre of the bud is seen to commence near that membrane, which lines the stem, and to pass through the circle of different vessels that constitute the ascending caudex of the new bud, while the descending caudex of it is secreted in the manner just explained.

Thus the bud is at first nourished in the bosom of its parent leaf, by a secretion from the vegetable juice suited to the purpose, continuing to be supported in the same way in annual herbs and evergreen trees, till it protrudes and expands its own leaf: but if it be a bud of a plant of the deciduous kind, that must lose its parent leaf in winter, a reservoir of nutriment is prepared for it in the roots of some sorts of plants, such as carrots, turnips, liquorice, fern, &c., and perhaps in the roots and alburnum of trees. Hence, in the spring the vessels of each bud of a tree absorb moisture from the earth, and propel it upwards through the roots and sapwood, where it is blended with a nutritious material, often discharged from wounds in the bark. And at this period the buds begin to swell out, and to send roots downwards from their caudexes into the ground; the outer texture of these caudexes constituting a new bark over the old one, consisting of different sorts of vessels. At the same time each bud likewise puts forth a leaf, or respiratory organ, resembling in some manner the lungs of animals, but differing in this respect; that the leaf stands in need of light as well as air for the purpose of perfect respiration. The different embryos of the leaf-bud being in this manner provided with their adapted organs of respiration, and various new ones formed in the summer season in the different leaf-buds, they now begin to pullulate in succession, each as in the first having its appropriate leaf, which, as they come forward in order, constitute the annual sprigs or shoots of trees, being of considerable length in some, as the vine, willow, &c., having a great number of new leaves. Consequently, when the spring frosts or insects

destroy the first set of leaves, as often happens in particular sorts of plants, they are succeeded by a second set from the second embryos of the same bud. But when the floral leaves are destroyed, as happens in some cases to fruit-trees, the fruit in the pericarp is not destroyed as in the first embryo of the leaf-bud, as it is supported by the system of absorbing vessels of the caudex, and the roots of the flower-bud, which form a part of the bark and run into the earth; but is more sour, and less perfect, on account of the juices from which it is secreted being less perfectly oxygenated.

About the middle of the summer season there is mostly either a new leaf-bud or flower-bud formed in the axilla of each leaf; becoming a branch the succeeding year when a leaf-bud, and affording many other leaves and buds; but when a flower-bud, the growth stops, being terminated in the seed. In the more vigorous growth of the plant, leaf-buds are wholly or chiefly afforded; but in the more advanced state of growth, when the vessels of the bark are more fully elongated, and the nutritive fluids less abundantly provided, or the buds become in a more mature state, the production of flower-buds takes place.

On these grounds, Doctor Darwin has concluded that the grafts taken from vigorous seedling apple-trees do not bear fruit till they are many years old; while those cut from weak old trees bear abundantly in a very few. The same principle holds good in various other cases. It is concluded that the facility of forming the long caudexes of the new buds which constitute the new filaments of bark, promotes the increase of leaf-buds, and affords a vigorous luxuriant aspect to the trees; while the difficulty of producing these new caudexes increases the quantity of flower-buds, and lessens the vigorous appearance of them. It is likewise conjectured that the generation of buds demands a less perfect apparatus than that of seeds, as the former constantly precedes the latter, in trees as well as herbs. Hence the age of the plant is another circumstance of consequence to the production of flowers, fruit, and seeds, as is exemplified in tulips, hyacinths, as well as in the apple and pear tree.

It is believed by some, that the buds formed in the summer may be either converted into leaf- or flower-buds, according as the branch is more or less strong or vigorous in its growth, even after the vegetable embryos are formed. In proof of which, Dr. Darwin observes, that "if the upper part of a branch be cut away, the buds near the extremity of the remaining stem having a greater proportional supply of nutriment, and possessing a greater facility of

producing their new caudexes along the bark, will become leaf-buds, which might otherwise have been flower-buds; and on the contrary, if a vigorous branch of a wall tree, which was expected to bear only leaf-buds, be bent down to the horizon or lower, it will bear flower-buds with weaker leaf-buds." In explanation of this interesting fact, it is added, that both the flower-buds and leaf-buds perish in the autumn; but the latter as they advance afford other leaf-buds or flower-buds in the summer, in the axilla of the different leaves, which new buds require new caudexes extending down the bark, and in this way thicken as well as lengthen the branch; while the flower-buds shed their seed, and are afterwards destroyed in the autumn, not requiring any place on the bark for new caudexes. Of course, on the summit of a branch being cut off, the buds near the end of the stem that is left produce new leaf-buds with more facility, as there is more room for their new caudexes to be generated along the descending bark. But if a vigorous branch be bent down to the horizon or below it, the bark is compressed beneath the curve, and extended above it; and thus the production of new caudexes along the bark is impeded, and in consequence less leaf-buds and more flower-buds will be generated, or the former converted into the latter, which require no new caudexes. On this circumstance, it is conceived, the management of wall-fruit trees and espaliers in a great measure depends.

With the intention of converting leaf-buds into flower-buds, it has been suggested by some, that the more vigorous shoots, and even large roots, should be bound round with wire; and by others, that of cutting or scoring the bark round the body of the tree with a sharp knife in the manner of a screw. Others have produced flowers and fruit on standard and wall trees, by removing a cylinder of bark three or four inches in length, and replacing it by some sort of bandage. And a similar effect has been produced by a straight bandage put round a branch. It is supposed also, on the same principle, that from the pressure afforded by the callus of an ingrafted branch of a tree on the part, it bears better.

At the period when the new buds become evident in the bosom of each leaf, as about midsummer, it has been remarked that a sort of stand takes place in vegetation for a short time, which has been attempted to be explained in different ways. Doctor Darwin, however, suspects that at this period the reservoir of nourishment for the support of the new buds is forming about the roots or in the alburnum of the tree, as well as the caudexes

down the bark and vessels destined to convey it to the new buds, which terminate in it.

On account of the roots of trees being protruded in a more vigorous manner at this than other periods, it has been preferred by Mr. Bradley, as the best adapted to the transplanting of trees when not removed to any great distance, as the new shoots in the ensuing spring will be sent forth with much greater force, and the tree of course be nearly a year forwarder in its growth, than if it be performed in the winter. This Doctor Darwin supposes to be owing to much of the nutritious material deposited in the roots for the support of the new buds, being destroyed in the operation, which is only capable of being restored at or about that period.

The first of these writers has advised, that in performing this business at the above period, none of the top, or branches, or foliage, should then be cut off. The propriety of this Doctor Darwin supports, by observing that, as it is from the vegetable juice oxygenated in its exposure to the air, "through the thin moist pellicle on the upper smooth surface of these leaves, that the nutriment for the expansion of the buds in the succeeding spring is secreted or produced," it follows that "if these leaves are prematurely destroyed, the vernal growth of the buds must receive injury, as the reservoir of future nutriment for them will be less in quantity; but if some of the branches are lopped during the winter, the remainder will protrude more vigorous shoots, as their share of the reserved nutriment will be greater." It is supposed that the vessels destined for the support of the new buds of deciduous trees, are analogous to those that permeate the lobes of the seed, being extended downwards in the bark towards midsummer, terminating in certain reservoirs of nutriment secreted at this time from the vegetable juice oxygenated in the leaves. This bark, it is observed by the above writer, "now consists of an intertexture of the caudexes of the present leaves, which were buds in the last summer, and are now adult vegetables; and of the embryon caudexes of the new buds, as well as of the vessels destined for conveying the support of the new buds: it will during the autumn, or following spring become alburnum, and by degrees be covered over with a new bark constituted of the mature caudexes of the new buds; whilst that which formed the alburnum in the preceding "becomes a circle of lifeless timber, interior to the circle of alburnum." It is likewise conceived that the vessels of this new bark, notwithstanding they are constituted "of the caudexes of the individual adult leaves, and

the vessels destined to convey the support of the individual young buds, obviously inosculate, as, when some buds chance to be rubbed off or destroyed, those near them grow in a more vigorous manner; which is constantly shown in the pruning of different sorts of trees.

It is further remarked, that the flower-buds of various trees proceed directly from the "last year's terminal shoots or spurs, either accompanied with leaf-buds, or separately, as in apple and pear trees." And that in "others flower-buds arise from the shoots of the present year alternately with leaf-buds, as those of vines, and form the third or fourth buds of the new shoots." These, it is added, "differ from leaf-buds in this circumstance, that they perish when their seeds are ripe, without producing any addition or increase to the tree; whereas, when the leaf-buds perish in the autumn, their caudexes, the intertexture of which constitutes the bark of the tree, gradually become converted into albumen or sapwood; over which the new leaf-buds shoot forth their caudexes and radicles, or insert them into it, and gradually fabricate the new bark and root fibres."

On the whole it is concluded that "the central part of an adult bud consists first of a conjunction" of the vessels that convey the juice, "from above and below, which exists in the caudex of the bud between the beginning of the leaf-vessels, and the beginning of the root-vessels, the circulation resembling that in many insects and fishes. It is probable too, that at the same place there is also a conjunction of the absorbent vessels. Each bud is likewise furnished with an organ of reproduction, which in the leaf-bud produces the lateral progeny or offspring, and in the flower-bud the seminal. And still further provided with a centre of nervous influence existing in each bud, probably residing near the conjunction of the vessels of the leaf and root just noticed, and of the absorbent system, together with the organ of reproduction.

Besides these, various other interesting facts and observations are recorded by the author of the *Philosophy of Gardening*.

BUDDING, the art or operation of propagating and producing trees or plants by inserting an eye or bud of one tree into the bark of some part of the stem, stock, or branch of another of the same kind, by means of an incision, the head or top of the stock or branch being cut off some time afterwards. The bud thus introduced soon shoots forth, and in time becomes a tree or plant in all respects the same as that from which it was taken. The effect is

produced by a reciprocal inosculatation of the wounded vessels of the different barks.

Almost all the more valuable and choice kinds of fruit-trees are increased in this way, as well as many shrubs and plants.

This is the only method by which the different approved varieties of many kinds of fruit- and other trees can with certainty be continued and multiplied; for, though their seeds readily grow and become trees, yet from the seeds or kernels of the finest varieties of fruit, not one tree out of a hundred produces any like the original, and but very few that are good; so variable are seedling fruit-trees, and many others: but the trees or stocks so raised being budded with the proper approved sorts, the buds produce invariably the same kind of tree, fruit, flowers, &c. continuing unalterably the same.

This mode of propagation is particularly useful for peaches, nectarines, apricots, plums, cherries, oranges, and jasmines; the three first of which succeed better by budding than grafting, and are usually worked upon plum-stocks raised from seed, and sometimes by suckers, layers, and cuttings. They are also often budded upon their own stocks, as such as have been raised from the kernels of these kinds of fruit; but they are commonly more strong and durable when budded upon plum-stocks.

There are also other sorts, as plums and cherries, which are often propagated by budding as well as grafting: the cherry is, however, generally the most prosperous by the latter method, as being more apt to gum and go off by budding. These sorts, being of the same genus, grow well upon stocks of each other, but best upon their own stocks.

Apples and pears are likewise capable of being propagated by budding as well as by grafting; though, as they grow freely by grafting, which is the most easy and expeditious mode, they are commonly propagated in that way.

In short, most kinds of fruit-trees, and others, propagated by grafting, also succeed by budding. Grafting is, however, more adapted to some sorts, and budding to others.

Various sorts of forest and flowering trees, both deciduous and ever-greens, are also capable of being propagated by budding with a greater certainty of continuing particular varieties, than by other means, as many of the variegated-leaved kinds, the variegated hollies, &c.

The operation of budding, in all sorts, is mostly performed upon young trees raised from seed, suckers, layers, &c. which are termed stocks, and which, when about half an inch thick in the bottom of the stem, are of a proper

size for budding on, though it may be performed upon stocks from the size of a goose-quill, to an inch or more in size. It must be performed principally, as has been seen, upon stocks or trees of the same genus, as it is but few trees that will succeed upon stocks of different genera. Peaches and nectarines, however, grow freely upon plum-stocks, as being very nearly related, which are the most common stocks on which these sorts are usually budded. But in most other kinds of fruit- or other trees, the stocks of the same genus must be had recourse to, both for budding and grafting on.

Stocks are commonly raised from seed, as the kernels or stones of these sorts of fruit, &c. sown in autumn or spring, in beds in the nursery, an inch or two deep; which, when a year or two old, should be transplanted into the nursery-ground, in rows two feet asunder, and fifteen or eighteen inches distant in the rows; to stand for budding, keeping them to one stem, and suffering their tops to run up entire. Stocks are also often raised from suckers arising from the roots of the trees of their respective sorts; likewise by layers and cuttings of the several kinds. See *Stocks*.

The operation of budding may also be performed upon trees that already bear fruit, when intended to change the sorts, or have different sorts on the same tree, or to renew any particular branches of a tree, performing the work with the young shoots of the year, or of one or two years' growth.

The most suitable season for performing the operation of budding is from about the middle of July until the middle or latter end of the following month: some however begin to bud in June; but the buds inserted so early, are many of them apt to shoot the same year; and the shoots not having time to harden, are liable to be killed by frosts in winter. The buds should always have finished their spring growth, and come off readily before they are eyed.

The buds for this use should be taken only from the young shoots of the same summer's growth, which should be cut from the most healthy and thriving trees of the sorts intended to be propagated; and if fruit-trees, from such as bear the finest fruit of the different kinds and varieties. A quantity of the best moderately strong young shoots should be cut each day as they are wanted; and, as they are collected, all the leaves cut off, with about a quarter of an inch of their foot-stalks remaining, trimming off also the soft unripened top-ends of the cuttings; they should then be covered from the sun and air, and taken as wanted. And as

each cutting furnishes many buds, they should be cut into pieces about an inch and a half long, as they are inserted into the stocks. These buds in the middle part of the cuttings are preferable to those towards the ends.

It is the common practice to insert one bud only in each stock; but some place two, one on each side, opposite each other.

The proper height to bud the stocks at varies according to circumstances. For dwarf-trees for walls and espaliers, &c. they should be budded from within about three to six inches of the bottom, that they may at first furnish branches near the ground. For half-standards, at the height of three or four feet; and for full standards, at from five to six or seven feet height; the stocks being trained accordingly. For half and full standards, the budding may, however, if necessary, be performed as low in the stock as for dwarfs, and the first shoot from the bud trained up to a proper height for a stem.

The proper apparatus for budding are, a small knife with a flat thin haft, for preparing the stock and buds for insertion, and opening the bark of the stock, to admit them, and a quantity of new bass strings to tie them, which should be previously well soaked in water to render them more tough.

As in this operation the head of the stock is not cut off, as in grafting, but left entire till the spring afterwards, and then cut off, a smooth part on the side of the stock, at the proper height, rather on the northward side, away from the sun, should be chosen for inserting the buds in; which should be done by making a horizontal cut across the rind of the stock, and from the middle of that a slit downwards about two inches in length, so that it may have the form of the letter T, being careful not to cut too deep, lest the stock should be wounded; then having cut off the leaf from the bud, leaving the foot-stalks remaining, a cross cut should be made about half an inch below the eye, and the bud slit off, with part of the wood to it, somewhat in form of an escutcheon; after this, that part of the wood which was taken with the bud should be separated, taking care that the eye of the bud be left; all those buds which lose their eyes in stripping, are useless; then gently raise the bark of the stock where the cross incision was made, with the flat haft of the knife clear to the wood, and thrust the bud into it; placing it smooth between the rind and the wood of the stock, cutting off any part of the rind of the bud, which may be too long for the slit made in the stock;

and having thus exactly fitted the bud to the stock, tie them closely round with bass mat, beginning at the under part of the slit, and proceed to the top, being careful not to bind round the eye of the bud, which must be left open and free.

But though it is the ordinary practice to divest the bud of that part of the wood which was taken from the shoot with it; in many sorts of tender trees, it is better to preserve a little wood to the bud, without which they often miscarry. This has occasioned some to imagine that some sorts of trees are not capable of being propagated by budding.

After the buds have been inserted three weeks or a month, they should be examined, to see which of them have taken; those which appear shrivelled and black, being dead, but those which remain fresh and plump have joined. At this time the bandage should be loosened, which, if not done in time, is apt to pinch the stock, and greatly injure if not destroy the bud.

In the following March, cut off the stock about three inches above the bud, in a sloping manner, that the wet may pass off, and not enter the stock; to the part of the stock left above the bud, the shoot which proceeds from the bud, which would otherwise be in danger of being blown out, may be tied the first year; after which it should be cut off close above the bud, that the stock may be covered by it. Some however think it a better practice to cut it close at once.

After this, the whole effort of the stock is directed to the inserted buds; they soon push forth strong, one shoot from each; many shoots also arise from the stock; but these should be constantly rubbed off as often as they appear, that all the powers of the stock may be collected for the vigour of the bud-shoot, which now commences the tree, and by the end of summer is in some sorts advanced three or four feet high; and in the autumn or spring following, the young trees may be transplanted into the places where they are to remain, or may remain longer in the nursery, according to the purposes for which they are designed.

Where the trees are of the fruit kinds, and designed for walls, espaliers, or dwarfs, the first shoot from the bud should, in the spring after it is produced, be headed down to four or five eyes, to force out first some lower shoots near the bottom; but if designed for half or full standards, and budded at proper heights, at first in tall stocks; the first shoot of the bud may either be shortened to four or five eyes, to

provide lateral branches near the top of the stem, to form a spreading head; or may be suffered to grow up in height, and branch out in its natural way, by which it will form a more erect head, of loftier growth. Such full or half standards as are designed for walls, and which were budded high on the stocks, must, however, necessarily have the first shoots headed down in the spring following, to force out lateral shoots to furnish the allotted space of walling.

But where trees are designed for any sort of standards, and budded low in the stock, the first shoot of the bud must be trained up for a stem to a proper height before it is stopped; and when arrived at its proper stature, be topped to throw out shoots to form a head at the desired height. See DWARF-TREES, ESPALIERS, WALL-TREES, and STANDARD-TREES.

BUDDLEA, a genus comprehending plants of the shrubby exotic green-house kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Personatæ*.

The characters of which are: that the calyx is a very small, four-cleft, acute, erect, permanent perianthium: the corolla is monopetalous, bell-form, four-cleft half way, erect, three times greater than the calyx: divisions ovate, straight acute: the stamina consist of four very short filaments placed at the divisions of the corolla: the anthers are very short, and simple: the pistillum is an ovate germ: the style simple, shorter by half than the corolla: the stigma obtuse: the pericarpium is an ovate capsule, oblong, two-furrowed, two-celled: the seeds numerous, extremely minute; adhering to a fungus receptacle.

The species cultivated are; 1. *B. Americana*, Long-spiked American Buddlea; 2. *B. occidentalis*, Spear-leaved Eastern Buddlea; 3. *B. globosa*, Round-headed Buddlea; 4. *B. salvifolia*, Sage-leaved Buddlea.

The first rises with a whitish woody stem from four to eight or ten feet in height, which is branched, and all over hoary: the leaves are ovate-lanceolate, opposite, serrate: the flowers are in long, slender spikes, axillary and terminating; composed of little, opposite, many-flowered, crowded racemes: the corolla is coriaceous, scarcely longer than the calyx: the divisions are upright, yellow within, and hoary on the outside. It is a native of America.

The second species rises much taller than the above, and divides into a great number of slender branches, which are covered with a russet hairy bark, with long spear-shaped leaves ending in sharp points: these grow opposite at every joint; at the end of the branches are pro-

duced branching spikes of white flowers, growing in whorls round the stalks, with small spaces between each. It has long, narrow, spear-shaped leaves growing between the spikes, but in the other sort they are naked. The leaves in this are much thinner than in the above species, and have scarce any down on their under side; the spikes of flowers grow more erect, and form a large loose spike at the end of every branch. It is a native of the West-Indies.

The third has a woody square stem: the leaves are serrate, sessile, acuminate, and tomentose underneath: the flowers have a yellow or orange colour, in close peduncled heads from the axils two together on opposite sides of the stalk and branches. It is a native of Chili; and flowers in May and June.

The fourth species rises with a shrubby four-cornered stalk eight or ten feet high, covered with a pale loose bark, and sends out many side branches. The leaves are five or six inches long, stem-clasping, acuminate, and downy on the under side. The branches are terminated by loose spikes of pale purple flowers, covered with a mealy down. It is a native of the Cape, and flowers in August and September.

Culture.—The two first species may be raised by sowing the seeds, procured in their capsules from the places where they grow naturally, in small pots filled with light earth, in the spring, covering them lightly, and plunging them in a hot-bed, occasional light waterings being given. The plants when sufficiently strong should be carefully separated, and planted out singly in other pots, being replunged in the hot-bed, and due shade, water, and air admitted. When these pots begin to be too small, they may be removed into others, and be placed in a refreshed tan hot-bed, where they should constantly remain. They should have little water during the winter season, but be kept warm. In summer much air and frequent refreshings of water, by sprinkling the plants all over, are however useful when the weather will admit.

The other species may be increased by planting cuttings from the young shoots in pots of light earth in the early spring season, plunging them into an old hot-bed, and, when they are become well rooted, removed into pots and placed in the shade till newly rooted, proper shade and moisture being given. They may then be placed in a warm border till the approach of winter, when they should be brought into the dry stove or greenhouse for protection. In mild winters, when protected from frost, it will sometimes succeed in warm sheltered borders in the open ground.

The plants are chiefly cultivated for ornament and variety in the stove and greenhouse.

BULB, a sort of large bud generated on the broad caudexes of plants within or in contact with the earth, and which shoot down their new roots directly into the ground; by which circumstances they are distinguished from buds, which are formed above the soil in the manner just described.

These are likewise further distinguished according to the manner in which they are constituted, into *tunicated bulbs*, *squamous bulbs*, and *solid bulbs*. The first sort is composed of several coats, closely infolding each other, as in the onion; and the second is constituted of different thin scaly plates placed over each other, similar to those in fish; as in the lily; while the third has a solid compact substance without any coats or divisions, as seen in the tulip.

Bulbs, like buds, Dr. Darwin observes, may be distinguished into leaf-bulbs and flower-bulbs; as “when a tulip seed is sown it produces a small plant the first summer, which dies in the autumn, and leaves in its place one or more bulbs. These are leaf-bulbs, which in the ensuing spring rise into stronger plants than those of the first year, but no flowers are yet generated; in the autumn these perish like the former, and leave in their places other leaf-bulbs, stronger or more perfect than their preceding parents.

“This succession of leaf-bulbs continues for four or five years, till at length the bulb acquires a greater perfection or maturity, necessary for seminal generation, and produces in its place a large flower-bulb in the centre, with several small leaf-bulbs around it.” It is suggested that this successive production of leaf-bulbs in plants of the bulbous-rooted kinds before the forming of a flower-bulb, is analogous to that of the producing of leaf-buds on different trees for many years previous to production of flower-buds. Thus, apple-trees raised from seeds afford only leaf-buds for a great number of years, but afterwards produce both flower-buds and leaf-buds. Hence it is conceived that the adherent lateral or paternal progeny is the most easy and simple, of course the first method of reproduction, and that the seminal progeny, for this reason, is not generated till the more mature age or more perfect state of the parent bud.

The author of the *Philosophy of Gardening* found, on dissecting two large roots of the onion kind in full flower, that the stem of each of them was surrounded by the cylindrical pedicles of six or seven concentric leaves; while the stem itself issued from the centre between three large new bulbs in one of them, and two in the other; all growing from the same caudex,

but the central flower-stem wrapped up at its bottom in one membrane only, separating it from the new bulbs near it. And on the examination of a large root of an onion produced from seed in the spring, by stripping off the leaves, and their fleshy bases one after another, until two buds were rendered visible in the centre of the fleshy bases of the concentric leaves that formed the bulb, it was found that these bulbs were obviously formed and nourished on the caudex by the stem, and its six or seven concentric cylindrical leaves. Or it is supposed from the difference in size, and seemingly increased maturity of the central bulb, as well as from the secondary bulb being placed between the innermost and second circular fleshy membrane, in these roots, as in those of the tulip, that merely the central bulb may produce a flower in the ensuing summer; while the lateral bulb or bulbs only afford stronger and more mature leaf-bulbs that in the succeeding summer produce a flower.

The caudexes or central parts of the bulbs, from which the roots descend and the leaves ascend, are placed differently in different roots; in some above the knot or bulb, in others below, and in others again in the centre.

In the tulip the caudex lies below the bulb whence the fibrous roots and new bulbs proceed, the root dying after it has flowered; the stem of the last year lying on the outside, and not in the centre of the new bulb. On examining a root of this sort in the early spring, immediately before it begins to shoot, a perfect flower may be seen in its centre, and between the first and second coat the large next year's bulb is believed to be produced; and between the second and third, and the third and fourth coats, other smaller bulbs are apparent, "all adjoining to the caudex at the bottom of the mother bulb;" which are said to require as many years before they flower, as the number of tunics by which they are covered. And similar different states of maturity, it is supposed, may take place in the buds round the shoots of different fruit-trees, the central one of which may afford flowers the ensuing year, as on the spurs of apple-trees; while those below require a greater or less number before "sufficiently mature to produce organs of sexual generation," which is a secret of great consequence in the management of trees of the fruit kind.

The root in the hyacinth differs from that of the tulip, as the stem of the last year's flower is said to be constantly met with in the centre of the root, the new offsets proceeding from the caudex below this bulb, and not from betwixt any of the concentric coats of it, except the

two exterior ones. For this reason the central part is apt, from its decay, to destroy the flower-bud unless removed from the ground at the time the leaves decay. On this account it has been supposed by florists, that these roots perish naturally in from five to seven years after flowering, while those of the tulip never die from their age.

The author of the *Philosophy of Gardening* found, on examining roots of this sort in September, that in one that had seemingly flowered during the summer, the stem was wholly decayed in the centre of various new bulbs, while in another, less in size, but compact, which was supposed not to have produced a flower, a central flower-bud was found inclosed in many concentric fleshy bases of former leaves. Hence he concludes that "the hyacinth root perishes annually or biennially, like the onion, leaving behind it a succession of leaf-bulbs or flower-bulbs." In the ranunculus, the caudex or claw-like root is believed to perish annually, after putting forth a circle of new claws from the upper part, round the bottom of the flower-stem: hence the claws of the old root, shrivelling as the flower advances, disappear in the autumn, and the decayed portion of the old caudex is visible below the new claw-like roots: hence the supposition of the old stem being drawn downwards by the new root fibres.

On these grounds it is concluded by Dr. Darwin, that "the concentric leaves that encircle the stem of bulb-rooted plants, are the lungs to the caudex, in the same manner as the leaves are to the buds in trees; and that the caudex with these leaves and the root-fibres constitute a vegetable that produces "a viviparous progeny of new leaf-bulbs, or a seminiferous progeny in flower-bulbs, with a magazine of nutriment in the fleshy base of each leaf." But that the tulip affords only leaf-bulbs for four or five years from the seed, and afterwards only one flower-bulb with many leaf-bulbs annually; while the onion kind produce two or three flower-bulbs in the first summer from the seed, which in the second afford flowers and other leaf-bulbs. And that it is probable, that all bulbous roots, as the buds of deciduous trees, and perhaps evergreens also, are properly biennial plants, as they rise in one summer and perish in the following.

When tulip or onion roots are planted deep in the earth, vegetable cords about an inch in length are seen sometimes to proceed from the caudex beneath the base of the cylindrical leaves, and form new bulbs. This is likewise the case in the natural growth of the roots of potatoes,

as similar spermatie cords are sent off from the old root, after the leaves of the stems are expanded in the air to oxygenate the juice, and in this way generate new tuberous or bulbous roots; a mode that is resembled above ground in the wires of strawberries.

These embryo vegetables, in the different bulbous and tuberous roots, are in different states of maturity, as was the case in the buds of trees: thus "in the potatoe the coraculum or plumula of the new plant is only visible, surrounded with a farinaceous nutriment, as in many seeds," while in the tulip and hyacinth the flower of the succeeding is discernible, as in the bud of the horse chesnut.

The ripening of the seed of some bulbous-rooted plants is promoted by destroying the new bulbs; and in others the flowering-bulbs are made stronger by taking them out of the earth, and removing the leaf-bulbs, as practised in the culture of the tulip and hyacinth.

As the bulbous and tuberous roots of plants are a lateral or paternal progeny, like the buds of trees, and of course exactly resemble the parent plants, they may be liable to become unhealthy by being affected with hereditary diseases; as is the case in *canker* in apple-trees long propagated by grafting; the *curl* in potatoes continued for a great length of time by roots, and the barrenness in haulboy strawberries too long increased by wires.

In the set of bulbs produced above ground on the flower-stems in the place of seeds, as happens in the magical onion, leek, and some other plants; they, after undergoing proper maturation, drop off and take root in the earth. With respect to these it is remarked by Doctor Darwin, that "though a perfect flower precedes the product of some summit-bulbs, he suspects that in others, as the magical onion, they are exactly similar to the bulbs produced at the roots, as on cutting one horizontally into two hemispheres in September, he perceived "three young bulbs inclosed in the concentric fleshy membranes of the summit-bulb" in this manner: on taking away five thick fleshy concentric coats, there appeared a single naked small bulb; and on the removal of the sixth, two others became evident, which were included in it. Hence it is concluded that these stem-bulbs are as forward as those of the root, and probably in every respect similar; and that "the bractes or floral-leaves, which in seed-bearing plants secrete or prepare a nourishment for the bud and pericarp of the flower, acquire in these bulbiferous onions and leeks a new office, and prepare a magazine of nourishment in the concentric membranes which surround

their summit bulbs;" and may of course be considered "a sexual viviparous progeny of vegetables."

It is a question by no means yet decided, whether the plants from these bulbs are liable to have the exact resemblance of their parents, or to be affected with hereditary diseases, in consequence of being long cultivated in succession, as has been supposed to be the case in those noticed above.

BULBOUS ROOTS, such roots as are formed in the above manner, and which differ from those of the tuberous kind, which are entirely solid and fleshy.

They comprehend several esculent plants of the kitchen-garden, as garlick, onion, leek, shallot, &c. and many flowery plants of the hardy herbaceous perennial sorts; capable of succeeding in beds and borders in the open ground; and others for the stove and greenhouse.

The chief flowering sorts are: those of the amaryllis kind, including the Guernsey lily, bella-donna lily, Jacobaea lily, &c.; the narcissus or daffodil kind, including jonquils, hyacinths, tulips, fritillaria, and crown imperial. The lily, including martagons; ornithogalum, or star of Bethlehem; galanthus, or snow-drop; leucojum, or great snow-drop; scilla, or sea-onion; colchicum; albuca, or bastard star of Bethlehem; muscaria, or musk and grape hyacinth; iris, the bulbous and Persian; hæmanthus, or blood-flower; crocus, including spring and autumn kinds; bulbocodium; pancratium, or sea daffodil; and various others.

Most sorts of bulbous roots increase rapidly by off-sets, in which manner all the particular sorts are continued, but the new varieties are obtained from seed.

The duration of bulbous rooted plants is different according to the kinds, being in some not more than a year after having attained a flowering-stalk, but in others longer. Previous to their dissolution they afford from their sides, or other parts, a supply of new buds, suckers, or off-sets, to perpetuate the respective kinds; so that, at the end of several years, what is considered as the same individual root is in fact a new one.

All bulbous-rooted plants renew their leaves and flower-stems annually; the principal seasons for the latter being those of the spring and summer; some producing their flowers at one time, and their leaves at another, as in some of the amaryllis and colchicum kinds; others their flowers and leaves together, as the hyacinth, tulip, narcissus, &c. The leaves and flower-stems of all the sorts, likewise, perish annually

at certain periods after flowering, at which time the root becomes in an inactive state of growth for some time, as six weeks or two months; in which period, and before they put out new fibres, to prepare for the future flower, it is proper to remove them, either to separate the off-sets for propagation, to plant the roots in fresh prepared earth, or to convey them to any other place. And likewise to preserve them out of ground for autumn and spring planting.

Most sorts, taken up at this period, may be kept out of ground several months; and some sorts admit of being kept out of the ground, from the time the flowers and leaves decay, until the following spring, as is often practised, to obtain a longer succession of bloom in the flowers. But bulbous roots may remain several years unremoved; and, when greatly increased by off-sets, taken up at the proper period, to separate the increased progeny.

It is, however, necessary to take up all the choice kinds of bulbous roots annually, to separate the off-sets for increase, as well as to prepare the earth of the beds and borders afresh, to promote the fineness of the succeeding year's bloom, as in tulips, hyacinths, narcissus, &c. The inferior sorts of bulbous roots should also be removed every other year, or as often as their off-sets are considerably increased; as, when increased into large bunches, they cramp each other in growth, and produce small ill-nourished flowers. All the bulbous roots taken up at the above period, should, where practicable; be planted again the following autumn, as they flower much stronger in this way than when kept out of ground till the spring season.

In order to preserve them in the best manner, when out of the ground, they should be placed in a dry situation.

Mr. Marshall in his work on Gardening directs that autumn-flowering bulbs, when their leaves are decayed, should be taken up in May; and that none of the kinds remain too long without being taken up, as they are liable to be cramped and confined in their growth, and of course decline in their beauty.

It is recommended as the best practice, with flowering bulbs, to plant the spring kinds in the beginning of the autumn, as in the latter end of September, or beginning of the following month; and those of the summer flowering in October, or the succeeding month; and those of the autumn blow in the latter part of July, or in the following month;—too early and too late planting being equally to be avoided, as when put in too soon they are liable to be injured by being too forward when the

winter and early spring prove severe, and when delayed too long they are apt previously to exhaust themselves by forming roots.

Bulbs of the laminated kinds, such as lilies, should not be kept out of the soil longer than six or eight weeks; the summer-flowering sorts being set at separate periods in the autumn, and in the beginning of the year, before the latter end of February, so as to produce a succession of flowers. With others of a more delicate nature, this method is also common; but they should have a dry sandy soil in order to stand the winter without rotting, where there happens to be much wet, succeeded by severe frosts. In these cases the protection of mats and the haulm of peas may often be found useful.

When bulbs have remained in the ground longer than the proper period, so as to have struck out new roots, they should always be removed with balls of earth, as where this is not attended to they grow weak. On this account the exact period for removal should be carefully observed.

The off-sets of bulbous roots should, in general, be put into the ground a considerable time before the periods of planting out the full-sized roots; those taken from laminated bulbs mostly requiring to be immediately replanted.

The soil most adapted to the growth of bulbous roots in general, is that of a sandy loam, where there is no stagnation of moisture below. Many sorts of these roots are not, however, very difficult in this respect, provided there be not an over-proportion of moisture. The ground for them should be prepared by digging it to the depth of from six to eight or ten inches, or more, reducing it well in the operation. After this has been done, it should remain a week or ten days before they are put in to become perfectly settled.

In regard to the disposal of these roots in planting, it is, for the larger and more curious sorts, in beds a little rounded, of three, four, or more feet in width, according to circumstances, or in patches in the common borders for the smaller kinds, in clusters of three, four, or five together, according to their growth. With the large sorts, such as the white and orange lily, crown imperial, &c., one in a place is sufficient. The fancy sorts of flowering bulbs, when planted in beds, are usually put in rows eight or nine inches apart, and from five to seven inches distant, in proportion to their growth. Some prefer less room; but where a strong flow is required, these distances are not too great. Hyacinths should in general have the space of seven or eight inches, and

tulips eight or nine; though it is often the practice to allow the former not more than five or six inches.

The depths of setting roots of the bulbous kinds are in general according to their sizes or growths, as three or four inches from their upper parts. But some sorts, as the crown imperial and crocus, will rise from a considerable depth, as six inches or more, and others from still greater; which has induced some persons to plant them to such depths as are sufficient to prevent their being injured by digging over the surface ground.

Different methods are employed in planting bulbous roots, as those of putting them in by the dibble, and in drills drawn by a hoe. The latter is in general to be preferred, as they are apt to lie hollow in dibbling, while by placing them in a drill they may be gently pressed into the soil, and be perfectly covered up. When they are set in beds, the best method is to draw off the mould a sufficient depth to one side, leaving the surface perfectly level, watering it a little in dry seasons, and then forming it into proper squares, placing a bulb in the middle of each, covering them with the mould drawn off so as to leave the bulbs in an upright position. After the bulbs have been put into the earth, if the weather continue very dry, a little water should be sprinkled over the beds or other places, to forward their vegetation and prevent their rotting.

Some protection is occasionally necessary in raising the more curious sorts of flowers of these roots, as, before they appear during the winter, the beds should be sheltered from too much wet, in order to guard against the effects of frost. And when they first present themselves above the ground, they should have the protection of an awning of cloth, mats, or other contrivances in the nights when the weather is severe; but they should not remain on in the day-time when it is tolerable. Some sort of covering of the same sort is likewise necessary when they are in blow, to shield them from the sun and rain, and continue them much longer in a perfect state of flowering.

There is a method of getting spring flowering bulbs forward, which is by setting them in pots or glasses for the purpose, in warm rooms, or in moderate hot-beds, as by these means they flower in winter. The hyacinth and narcissus, as well as several others, may be managed in this way with facility. These should be placed in pots of light dry sandy earth in autumn, as about the beginning of October, water being occasionally given. They may likewise be put into glasses at the same period,

and occasionally every three or four weeks, till the latter end of February, in order to have them flower in succession. In this method the bottom of the bulbs should be just immersed in the water, which should be renewed once a week or oftener, so as to keep it constantly up to the bottoms of the bulbs. Soft water is the best for this purpose. The *blow* is said, by Mr. Marshall, to be considerably strengthened by dissolving a portion of nitre, about the size of a pea, in the water each time it is changed.

Besides the raising of flowers from root-bulbs in these modes, there are some produced from little bulbs formed on the sides of the top-parts of the stems, as in the bulbiferous lily. These should be taken off about August, and, after being dried a little in the sun, planted out in rows in the nursery, in the same manner as off-sets.

By these means the various bulbous-rooted plants may be continued: but in order to produce new varieties recourse must be had to seed, which should be carefully saved, when fully ripened, from the best and most curious flowers, and which, after having been hardened a little in the sun, should be sown in boxes of light rich earth, setting them in a sheltered sunny situation, but not under cover. This is usually done about the latter end of August, or beginning of the following month; hyacinths, tulips, and other large sorts being covered to the depth of nearly an inch, and others, of the smaller sorts, half an inch. A little water should be occasionally given when the season is dry, to keep the soil moist, but not wet. The seeds may be protected till they come up, by a little covering of some kind of strawy material. Other sowings may be made in March, or the following month, the boxes being brought into southern exposures, where there is only the morning sun towards May. The young seedling plants should be protected in severe frosty weather, and when there is much rain, by means of mats and hoops, and a reed hurdle or other contrivance to break off the north-east winds.

The young plants should likewise be kept properly thinned out, and perfectly free from weeds. When the stems decay, a little mould should be put upon them to the thickness of half an inch. In the following summer, when the leaves decay, as about August, they should be planted out into nursery-beds, at the distance of two or three inches, according to the kinds. Some sorts, as the hyacinth and tulip, require to be removed from these into other nursery-beds as soon as their tops decline, and set at six inches distance; or it is probably a better

practice to thin them out to this distance in the first beds. After this they are to be managed as blowing plants. These sorts of roots blow at different lengths of time after being raised, some in the following year, and others not till several years afterwards; as will be explained under the culture of each of the different sorts.

BULBOCODIUM, a genus containing a plant of the bulbous-rooted flowering perennial kind. Mountain Saffron.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that there is no calyx: the corolla hexapetalous, funnel-form: claws very long, linear: throat connecting the petals: border erect: petals lanceolate, concave: the stamens consist of six subulate filaments, inserted into the claws of the petals: the anthers are incumbent: the pistillum is an ovate-subulate germ, obtusely three-cornered, and superior: the style is filiform, the length of the stamens: the stigmas three, oblong, erect and channelled: the pericarpium is a triangular, acuminate capsule, angles obscure, and three-celled: the seeds are numerous.

There is only one species cultivated for ornament, *B. vernum*, Spring-flowering Bulbocodium.

In this the bulb or root resembles that of common colchicum in shape, but is much smaller; it is covered with a dark-brown skin. In January, or before the middle of the following month, the flower springs up inclosed within three brownish-green leaves, which opening themselves as soon almost as they are out of the ground, show their buds for flowers within them very white oftentimes, before they open far, and sometimes also purplish at first appearing. There is frequently only one flower, but never more than two flowers on a root; they never rise above the leaves, or the leaves much higher than them, whilst they last; they are smaller than those of colchicum; at first are of a pale red or deep blush colour, but afterwards change to a bright purple, and continue long in beauty, if the weather be not severe. After the flowers are past, the leaves grow to the length of four or five inches, and in the middle of them the seed-vessel rises up.

It has the habit of colchicum, but differs in having only one style: from the crocus, which it much resembles, it is also distinguished by the number of its stamens. It is a native of Spain, &c.

Culture.—This may be increased by off-sets removed at the time when the flower and leaf decay,

every second or third year; also by sowing the seed in pots filled with loamy earth, in autumn, sheltering them in a frame from frost during the winter: the plants appear in spring, which, on the decay of the leaves, should be taken up for planting in the borders in the following autumn, where they flower the year following.

When the roots are not frequently taken up, they flower much stronger, and produce a greater increase than when treated in the contrary manner.

The plants should have a warm situation, and fresh soil that has not been improved by manure.

They afford an agreeable variety in beds, borders, and clumps, of pleasure- and other grounds.

BUPHTHALMUM, a genus comprehending plants of the herbaceous and shrubby kinds. The Ox-eye.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ*.

The characters are: that the calyx is common various in the different species, imbricate: the corolla is compound radiated: corollules hermaphrodite, numerous, forming a flat disk: females more than ten in the ray. Proper of the hermaphrodite funnel-form, with a five-cleft, patulous border. Of the female ligulate, longer, spreading, three-toothed: the stamens (of the hermaphrodite) consist of five capillary, very short filaments: the anthers are tubular and cylindric: the pistillum (of the hermaphrodite) is an ovate, compressed germ: the style is filiform, the length of the stamens: the stigma thickish and simple. Of the female, the germ ancipital: style filiform, of the same length as in the hermaphrodite: the stigmas two, and oblong: no pericarpium: the calyx unchanged: the seeds of the hermaphrodite solitary, oblong, crowned with a gashed manifold edge. Of the females, solitary, compressed, with each edge cutting, crowned like the others: the receptacle is chaffy and convex.

The species are; 1. *B. helianthoides*, Sun-flower-leaved Ox-eye; 2. *B. salicifolium*, Willow-leaved Ox-eye; 3. *B. grandiflorum*, Great-flowered Ox-eye; 4. *B. maritimum*, Sea Ox-eye; 5. *B. frutescens*, Shrubby Ox-eye; 6. *B. arborescens*, Tree Ox-eye.

The first has a perennial root, branched, whitish, and fragrant. The stems are annual, several, upright, branched at top, naked at the base, round, the thickness of a quill, red with a sea-green bloom, pithy and jointed as it were with a ring of petioles: the twigs opposite, and

stiff, like the stem. The leaves are remote, acuminate, loosely serrate, but entire at the base and the point, decurrent, veined and wrinkled: the nerves and veins prominent beneath, scored above, almost naked or scarcely apparently villose, beneath without hairs and paler, they are flat, reclining, four inches long, and two and a half broad. The petioles spreading, embracing the stalk by the ring which connects them with it, round on one side, channelled on the other, edged at the top by the leaf running along it, one-fourth of the leaf in length. The flowers terminating on every side, yellow, from two to three inches in width. The peduncles commonly three from the last leaves, stiff, one-flowered, very long, obscurely angular or streaked, thickened at the top, and fistulose. It is a native of North America, and flowers from July to October.

In the second species the root is perennial; the stem annual, upright, round, a foot or eighteen inches in height, with upright, one-flowered branches. The root-leaves are petioled and ovate; the stem-leaves embracing, oblong, or lanceolate, slightly toothed, and hairy or villose. The flowers naked, large, with the ray of a deep yellow, but the disk rather brown. It is supposed the yellow Aster of the Italians, and to be a native of Italy and the South of France, flowering from June to October.

The third has likewise a perennial root with an annual stalk, that rises nearly two feet high, having slender branching stalks, and oblong smooth leaves ending in a point: the flowers are produced at the extremity of the branches, and are of a bright yellow colour. It is a native of Italy, and flowers in June and July.

The fourth species is a low perennial plant, with a shrubby stalk, rarely rising a foot high, with many spreading branches. The leaves are hairy, narrow at their base, but broad and roundish at the extremity. The flowers are produced at the ends of the branches, are yellow, and shaped like those of the following sort, but the leaves of the calyx are soft and blunt. It is a native of Sicily, and flowers from July to September.

The fifth rises with several woody stems from the root, and grows to the height of eight or ten feet, furnished with leaves very unequal in size, some of which are narrow and long, others broad and obtuse; these are intermixed, sometimes coming out at the same joint, and often at the intermediate one; they are soft, hoary, and placed opposite. The foot-stalks of the larger leaves have, on their upper side, near their base, two sharp teeth standing upward, and a little higher there are generally two or three more, growing on the edge of the leaves.

The flowers are produced at the ends of the branches single; these are of a pale yellow colour, and have scaly calyxes. It grows naturally in America, also in Jamaica, near the sea-side, in a bushy tufted form, seldom rising above two or three feet in height.

The sixth species seldom grows much more than three feet high, sending out many stalks from the root, which are succulent, except near the root, where they are ligneous, garnished with thick, succulent, spear-shaped leaves placed opposite: the flowers are produced at the end of the branches upon foot-stalks which are two inches long. These flowers are larger than those of the above sort, and of a bright yellow colour. They appear in July, August, and September, but often continue till the end of October. It is a native of Bermudas.

Culture.—The herbaceous kinds are capable of being easily multiplied by their roots, which should be effected in the autumn or spring, either by taking off slips from them, or taking them up, and dividing the roots into several parts, planting the slips or divided parts in the places where they are to remain.

They are also propagated plentifully by sowing the seeds in a bed of common earth, in spring or autumn.

The shrubby maritime kinds are easily increased by planting the cuttings of their branches, in the spring and summer seasons, in pots of light earth, and plunging them in a moderate hot-bed, to facilitate their rooting, though those planted in summer will frequently strike root tolerably without such assistance, occasional shade and waterings being given. When they are advanced a little in growth, they should be planted out in separate pots, and remain in the full air till the end of autumn, when they must be removed to the shelter of a greenhouse or glass case.

The herbaceous sorts, from their hardy nature, are proper for being planted out in the fronts of large borders, clumps, or other parts of pleasure-grounds, where they have an ornamental effect for a great length of time in the summer season.

The shrubby, tree, and maritime kinds afford variety in the greenhouse, in assemblage with other exotics that require to be raised in pots.

BUPLEURUM, a genus comprising plants of the evergreen shrubby kind. Hare's Ear, or *Æthiopian Hartwort*.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal umbel, with fewer than ten rays; par-



Painted by Syd Edwards

London Published July 1805 by G. Kearsley Fleet Street

Engraved by E. Snylen

Bupleurum fruticosum
 1 Shrubby Hares ear

Bulbocodium vernum
 2 Spring Bulbocodium

Blitum capitatum
 3 Berry headed Strawberry-Blite

tial with scarcely ten rays, erect-expanding; involucre universal many-leaved; partial five-leaved, larger; leaflets expanding, ovate, acute: the perianthium proper obscure: the corolla is universal uniform: floscules all fertile: proper, of five, involuted, entire, very short petals: the stamina consist of five simple filaments: the anthers roundish: the pistillum is an inferior germ: the styles two, reflected, and small: the stigmas very small: there is no pericarpium: fruit roundish, compressed, striated, splitting in two: the seeds two, ovate-oblong, convex and striated on one side, flat on the other.

The species for the purpose of ornamental culture are: 1. *B. fruticosum*, Shrubby Hare's Ear, or Ethiopian Hartwort; 2. *B. difforme*, Various-leaved Hare's Ear; 3. *B. frutescens*, Grass-leaved Shrubby Hare's Ear.

The first is an evergreen shrub rising to the height of five or six feet, and dividing into many branches so as to form a large regular bush. The stem is covered with a purplish bark; the branches are well furnished with oblong, smooth, shining, stiff leaves, of a sea-green colour, placed alternately, four inches long, and one broad in the middle; at the ends of these the flowers are produced in umbels: they are yellow at first, but fade away to a brown: they come out in July and August, but seldom perfect seeds in this climate. It is a native of the South of France.

The second species rises with a shrubby stalk to the height of five or six feet, sending out some side branches, which in the spring have on their lower parts leaves composed of many small flat leaflets, finely cut like those of coriander, and of a sea-green colour; these leaves soon fall off, and the upper part of the branches is closely covered with long rush-like leaves having four angles, coming out in clusters from each joint. The flowers grow in spreading umbels at the extremities of the branches; are small, of an herbaceous colour, and succeeded by oblong channelled seeds. It is a native of the Cape, and flowers from June to August.

The third has a shrubby branching stem of moderate growth: the leaves are sharp and rather fleshy; and the flowers in small umbels at the end of the branches. It is a native of Spain, and flowers in August and September.

Culture.—These sorts of plants may be propagated either by seeds or cuttings. In the first method the seeds should be sown in autumn, soon after they are ripe, in pots of light mould, and placed in a frame, to have shelter from frost during winter, and in spring plunged in a hot-bed, especially the two green-house kinds, which

soon brings up the plants. These should be inured to the full air, and, when of proper growth, transplanted into separate small pots, shade and occasional waterings being given in the summer: in autumn the plants should be placed in a green-house or frame, and in spring following those of the first sort planted out in the nursery-ground.

In the second method the cuttings should be planted out in spring, in pots of light earth, plunging them in a moderate hot-bed, where they readily take root.

The common shrubby kind may also be raised by cuttings in the common ground, by planting them in the later summer months, and sheltering them occasionally from the frost during the winter; or by planting them in pots at the same time, and placing them in a garden-frame for occasional shelter from frost. In either method the cuttings emit roots in the spring; water being freely given in summer, and shelter again in winter. In the spring following they should be planted out in a sheltered place in the nursery, to attain proper growth for the shrubbery quarters.

The first affords an ornamental effect in the fronts of clumps and other parts of shrubberies, and the others in assemblage with other potted plants of similar growth.

BUTCHER'S BROOM. See *Ruscus*.

BUTOMUS, a genus containing a plant of the flowery perennial aquatic kind. The Flowering Rush, or Water Gladiolus.

It belongs to the class and order *Enneandria Heragynia*, and ranks in the natural order of *Tripetalideæ*.

The characters are: that the calyx is a simple, three-leaved, short involucre: the corolla consists of six petals, roundish, concave, withering; three outer alternate, smaller, more acute: the stamina consist of nine subulate filaments: the anthers are bilamellate: the pistillum has six germs, oblong, acuminate, ending in styles: the stigmas are simple: the pericarpium consists of six capsules, oblong, gradually attenuated, erect, one-valved, gaping on the inside: the seeds are very many, oblong-cylindric, obtuse at both ends, fixed to the wall of the capsules.

There is only one species: *B. umbellatus*, Umbellated Butomus, or Flowering Rush.

It has a thick, oblong, fibry, perennial root: the leaves are ensiform, long, triangular, smooth, quite entire, spongy, at bottom sheathing, at top flat and twisted: the scape upright, round, smooth, from one to three or five and six feet high: the flowers to thirty, each on a single round peduncle, from an inch to about a finger's

length, forming an upright umbel, surrounded at bottom by an involucre of three withering membranous sheaths; besides a smaller stipule to each peduncle: corolla handsome, near an inch in breadth; commonly of a bright or pale flesh-colour, purple or rose-colour. It is a native of most parts of Europe, and flowers in June and July.

There are varieties with white flowers; with red flowers; with deep purple flowers.

Culture.—The propagation in this plant is effected either by seed, or the roots. In the first mode the seed may be sown thick, in any watery or boggy place, in the autumn, and left to nature. In the second method the roots should be removed any time after flowering, and such as admit of it, divided, planting them at once in the places allotted them, where they flower annually for a great length of time.

These plants are very ornamental on the sides of waters, or in soft boggy situations, in pleasure grounds.

BUXUS, a genus containing plants of the hardy evergreen kind.

It belongs to the class and order *Monoecia Tetrandria*, and ranks in the natural order of *Tricocææ*.

The characters are: that the male flowers are prominent from the buds of the plant: the calyx is a three-leaved perianthium: leaflets roundish, obtuse, concave, and spreading: the corolla consists of two roundish, concave petals, very like the calyx, but larger: the stamina consist of four subulate filaments, erect-expanding, rather larger than the calyx: the anthers are erect and twin: the pistillum is the rudiment of a germ, without style or stigma. The females in the same bud with the males: the calyx is a four-leaved perianthium: leaflets roundish, obtuse, concave, spreading: the corolla consists of three roundish, concave petals, very like the calyx, but larger: the pistillum is a superior germ, roundish, obtusely three-cornered, ending in three very short, permanent styles: the stigmas obtuse, hispid: the pericarpium is a coriaceous, roundish, three-beaked, three-celled capsule, bursting elastically into three parts: the seeds are twin, oblong, rounded on one side, flat on the other.

There is only one species: *B. sempervirens*, Evergreen Tree Box.

It is observed by Martyn, that Box, in its dwarf state, is a well-known shrubby plant, about three feet in height; that when left to itself, it becomes a tree, twelve or fifteen feet high, with a trunk equalling the human thigh in thickness, covered with a rugged, grayish bark, that of the branches yellowish. The wood is of

a yellow colour, of an even close grain, very hard and ponderous. The leaves are ovate or oval in the common sort, hard, smooth, glossy, evergreen, very dark green above, pale green underneath, something resembling those of myrtle, but blunt and commonly emarginate at the end: the edges are revolute: they are set on very short petioles, and on the twigs they come out regularly in pairs, so close as almost to conceal them. On these, from the axils of the leaves, come out the small herbaceous flowers, in round bunches; a female flower occupying the middle of the bunch, and being surrounded by several males. It is a native of most parts of Europe.

There are varieties of Tree Box with broad leaves, with narrow leaves, with silver-striped leaves, with silver-edged leaves, with gold-striped leaves, with gold-edged leaves, with gold-tipped leaves, with curled striped leaves: and of the Dwarf shrubby kind there are sub-varieties, with green leaves and with striped leaves.

Culture.—This species and all the different varieties of Box may be easily raised either by seeds, layers, or cuttings, though the two last are the methods most commonly employed, and the only ones for the variegated sorts, so as to continue the different kinds with certainty.

In the first mode the seed should be sown in autumn, soon after it becomes ripe, in a border of light earth, half an inch deep. The plants appear in spring, and are fit to plant out in the nursery, in rows, in about two years afterwards. They may be increased in the layer method any time in the year; but the spring is the most eligible season, or in the autumn, as they will be well rooted for planting out in the autumn following.

When raised by cuttings, they may be planted in autumn, or any time in the spring, but the sooner the better; for which purpose shoots of one or two years' wood should be chosen about six or eight inches long, and planted in a shady border half way in the earth, and six inches distant, water being freely given in dry weather.

The Dwarf sort may be propagated very readily by off-sets or suckers from the roots, which may be parted any time from the autumn to the spring, or even later. Those intended to be trained as shrubs should be planted singly in rows in the nursery a foot asunder; but when intended for edgings, they may be planted close to one another, in rows; the slips with small root fibres being chiefly made use of for the purpose.

For the purpose of edgings, such plants as are short and bushy are to be preferred, and those whose roots are short and very fibrous.

B U X

The dwarf shrubby kinds of these plants are often cultivated for sale in the nurseries, for edgings, being planted in close rows, and commonly sold by measurement, generally at about six-pence per yard, running measure, and one yard of which, when good and close, will plant three or four on being parted.

In parting the Box for edgings, it should not be divided into very small slips, but, if possible, each slip should be furnished with fibres; for although the naked or rootless slips will grow, they should not be planted with the rooted ones, as many may fail, and occasion gaps in the edgings. The plants when slipped should be trimmed both at root and top, cutting off or shortening the long sticky roots, but the tops

B U X

should not be cut too close to appear stubby. See EDGING.

All the varieties are hardy, and capable of succeeding on almost any sorts of soil and exposures. When cultivated for the wood, which is of a fine hard dense texture, they may be planted on the poor chalky or gravelly soils with success.

The different sorts, when planted as shrubs, have a very ornamental effect in the fronts and other parts of the borders and clumps of pleasure-grounds, in assemblage with others of the more large-leaved evergreen kind. They are likewise employed for the forming of ornamental hedges, and for being clipped into different forms.

C A C

CABBAGE. See BRASSICA.
CABBAGE-TREE. See CACALIA KLEINIA.

CACALIA, a genus comprehending hardy herbaceous, flowery, perennial, and shrubby plants. Foreign Coltsfoot.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common simple, oblong, at the base only sub-calyced, cylindric: the scales five to ten, equal, lanceolate-linear, forming a tube; a few very short, incumbent on the base: the corolla is compound and tubular: the corollules are hermaphrodite, in number the same as the longer leaves of the calyx, and uniform; proper funnel-form, gradually lessening to the tube: border four- or five-cleft, and erect: the stamina consist of five capillary filaments, very short: the anther cylindric and tubular: the pistillum is an oblong germ: the style filiform, the length of the stamens: the stigmas two, oblong and revolute: the pericarpium none: the calyx unchanged: the seeds solitary, oblong, and ovate-narrow: the down capillary, and very long: the receptacle is naked, flat, and dotted.

The species most commonly cultivated are: 1. *C. suaveolens*, Sweet-scented Cacalia; 2. *C. atriplicifolia*, Orach-leaved Cacalia; 3. *C. Alpina*, Alpine Purple Cacalia; 4. *C. pupillaris*, Rough-stalked Cacalia; 5. *C. Anteuportium*, Oval-leaved Cacalia; 6. *C. Kleinia*, Olcander-

C A C

leaved Cacalia, or Cabbage-tree; 7. *C. Ficoides*, Flat-leaved Cacalia. There are several other species that are equally deserving of cultivation.

The first species has a perennial creeping root, sending out many stalks: the leaves are long, smooth, and veined, of a pale green on their under side, but a deep shining green above, and placed alternately. The stalks rise to the height of seven or eight feet, are streaked, quite simple, and terminated by corymbs of white flowers. It smells very sweet when dry; and is a native of Virginia and Canada, flowering in August and ripening its seeds in October.

The second species has also a perennial root, composed of many fleshy spreading tubers, sending out several strong stalks in the spring, four or five feet high: the leaves are sea-green on their under side, but darker above, placed alternately the length of the stalks, which are terminated by umbels of herbaceous-coloured flowers. It is of the same size and stature with the above, and a native of Virginia, flowering here in August.

The third has likewise a perennial root: the stem is a foot and half high, or more, leafy and branching at intervals: the leaves are on very long petioles; the lowest either very long heart-shaped, or broader approaching to kidney-shaped, with the intervals of the toothings semilunar; some are wholly smooth; some have the nerves only hairy; others are wholly tomentose, and thicker. The stem branches at top, and on the subdivisions, bear a broad and dense corymb of flowers. It is a native of Switzerland.

There are varieties with smooth green leaves, with hairy leaves, and with hairy thick leaves.

The fourth species resembles the sixth in its form and manner of growth, but the leaves are narrower and more succulent. These do not fall off entire, as in the other, but break off at the beginning of the foot-stalks, which are very strong and thick, and always continue; so that the main stalk of the plant, and the lower part of the branches, which are destitute of leaves, are set round on every side with three truncated foot-stalks, and thus defended in a singular manner from external injuries. It is a native of the Cape, but has not yet flowered in this climate.

The fifth rises with many succulent stalks from the roots, as large as a man's finger, branching out upwards into many irregular stalks of the same form, but smaller: the leaves are succulent, alternate, blunt; under each foot-stalk are three smooth lines or ribs which run along the branch. It is a native of the Cape, but rarely flowers here.

The sixth species rises with a thick fleshy stem, divided at certain distances, as it were, into so many joints; each of these divisions swells much larger in the middle. The stalks divide into many irregular branches of the same form, which towards their extremities have long, narrow leaves, of a glaucous colour, standing all round without order. As these fall off, they leave a scar at the place, which always remains on the branches. The flowers are produced in large clusters at the extremities, and are of a faint carnation colour. It grows naturally in the Canary islands, flowering in August and the two following months, but does not produce seed here.

It is denominated *Cabbage-tree* by some, from the resemblance which the stalks have to those of cabbage; and others have named it *Carnation-tree*, from the shape of the leaves and colour of the flowers.

The seventh species rises with strong round stalks to the height of seven or eight feet; which are woody at bottom, but soft and succulent upwards, sending out many irregular branches. These, for more than half their length, have thick, taper, succulent leaves, a little compressed on two sides, ending in points, covered with a whitish meal: when broken, they emit a strong odour of turpentine, and are full of a viscid juice. At the extremities of the branches the flowers are produced in small umbels; which are white, and cut into five parts at top: the stigma is of a dark purple colour, and stands erect above the tube. The seeds do not ripen here.

In France, the leaves are sometimes pickled, with the white meal preserved on them. It is a native of the Cape of Good Hope, flowering from June to November.

The first three species are herbaceous, and hardy enough to be planted in the open ground; but the last four are shrubby, and require the protection of a green-house in the winter.

Culture.—The herbaceous kinds may be raised either by their roots or the seeds. In the first method, the roots should be divided and planted out either in the autumn or early in the spring. In the latter mode, the seeds should be sown or left to shed in the autumn or spring seasons.

The shrubby species may be easily increased by cuttings of the young branches, which should be planted in pots of light sandy mould; during the spring or summer months, after being cut into pieces of five or six inches in length, and left some days exposed to dry and heal over the cut parts. Those planted in the spring season may be plunged in a hot-bed, but during the summer they take root easily without such aids.

The first sorts afford variety in the large clumps and borders of extensive pleasure-grounds; and the latter sorts, from the singularity of their growth, produce much variety in the green-house in assemblage with other curious plants.

CACTUS, a genus comprising plants of the succulent exotic kind. The Melon Thistle, Torch Thistle, Creeping Cereus, and Indian Fig sorts.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is an one-leaved, imbricate, hollow-tubular perianthium, with scaly leaflets scattered over it, superior, deciduous: the petals numerous, rather obtuse and broad; the outer ones shorter; the inner larger and converging: the stamina consist of numerous subulate filaments inserted into the calyx: the anthers oblong, erect: the pistillum is an inferior germ: the style the length of the stamens, cylindric: the stigma headed and multifid: the pericarpium is a berry rather oblong, one-celled, umbilicate, and roughened as the calyx is: the seeds are numerous, roundish, small, nestling.

The species chiefly cultivated as curious or ornamental plants are: 1. *C. mammellaris*, Smaller Cactus, or Melon Thistle; 2. *C. Melo-cactus*, Melo-cactus, Great Melon Thistle, or Turk's Cap; 3. *C. tetragonus*, Four-angled Upright Cereus, or Torch Thistle; 4. *C. penta-*

gonus, Five-angled Upright Torch Thistle; 5. *C. hexagonus*, Six-angled Upright Torch Thistle; 6. *C. heptagonus*, Seven-angled Upright Torch Thistle; 7. *C. repandus*, Slender Upright Torch Thistle; 8. *C. lanuginosus*, Woolly Upright Torch Thistle; 9. *C. Peruvianus*, Peruvian Upright Torch Thistle; 10. *C. Royeni*, Royen's Upright Torch Thistle; 11. *C. grandiflorus*, Great-flowering Creeping Cereus; 12. *C. flagelliformis*, Pink-flowering Creeping Cereus; 13. *C. triangularis*, Triangular Cereus, or Strawberry Pear; 14. *C. Opuntia*, Common Indian Fig, or Prickly Pear; 15. *C. Ficus Indica*, Oblong Indian Fig; 16. *C. Turca*, Great Indian Fig, or Prickly Pear; 17. *C. cochenillifer*, Cochineal Indian Fig; 18. *C. Curassavicus*, Curassao, or Least Indian Fig, or Pin-pillow; 19. *C. spinosissimus*, Cluster-spined Indian Fig; 20. *C. Phyllanthus*, Spleen-wort-leaved Indian Fig; 21. *C. alatus*, Narrow Long-jointed Indian Fig; 22. *C. moniliformis*, Neck-lace Indian Fig; 23. *C. pereskia*, Barbadoes Gooseberry.

The first differs from the following species in being smaller and covered all over with tubercles, between which the flowers and fruit come out, round the middle of the plant: the body is roundish, oblong, or melon-shaped: the flowers appear in July and August: the fruit is of a fine scarlet colour, continuing fresh upon the plants during the winter, which has a very beautiful effect at that season.

There are varieties with white spines, with red spines, and a proliferous or childing variety: this is only a little larger than the other, growing nearly in the same form, but produces a great number of young plants from the sides: it has tufts of a soft white down upon the tubercles or knobs, and also between them; the whole plant appearing as if covered with fine cotton: the flowers are larger, but not succeeded by fruit in this climate, young plants being thrust out in their stead the following season from the places where the flowers had been.

The second species appears like a large fleshy green melon, having deep ribs, set all over with strong sharp thorns. When cut through the middle, the inside is found to be a soft, green, fleshy substance, very full of moisture. The flowers and fruit are produced in circles round the upper part of the cap. Some brought hither have been more than a yard in circumference, and two feet and a half high including the caps; but in the West Indies there are plants much larger. They resemble a hedge-hog in their form and spines.

There are varieties with straight angles, with fifteen angles spirally twisted and erect spines, with fifteen angles and broad recurved spines,

with fourteen angles and broad recurved spines, with fourteen angles and white spines.

The third species has an upright four-angled succulent stem; the angles are compressed, armed with spines, and far asunder. It is subject to put out many shoots from the sides, which stops its upright growth, so that the plants rarely rise more than four or five feet in height.

The fourth has a succulent jointed stem; the internodes a foot long: knots of spines come out along the edge without any visible nap among them; and sometimes, but rarely, the stem has six angles: it never puts out any roots, and, though slender and weak, grows upright to the height of several feet.

In the fifth species the angles are armed with sharp spines, coming out in clusters at certain distances, and spreading from a centre every way: the outer substance of the plant is soft, herbaceous, and full of juice, but in the middle there is a strong fibrous circle running the whole length, which secures the stems from being broken by winds: they rise to the height of thirty or forty feet when their tops are not injured, and they have room to grow; but whenever the stems are cut, or injured, they put out shoots from the angles, immediately under the wounded part, and frequently one or two lower down: these, when not cut off, form distinct stems, and grow upright; but they are seldom so large as the principal one, especially if more than one be left on a plant. The flowers come out from the angles on the side of the stem; and have a thick, fleshy, scaly, round, channelled, hairy peduncle, supporting a swelling germ, upon the top of which sits the scaly, prickly calyx, closely surrounding the corolla till a little time before it expands: the flower is then as large as that of a hollyhock; the inner petals being white and crenated at their extremity: the calyx is green, with some purple stripes: it is not succeeded by fruit in this climate, nor do the plants produce flowers frequently; but when this happens, there are generally several. The usual time of flowering is in July.

The sixth has an upright shorter stem, which is oblong and seven-angled, the angles deeply cut and armed with spines. According to some, it runs to the height of a foot and a half or two feet. It has not flowered in this climate.

The seventh species is described as having the smallest stem of any of the upright sorts; generally with nine obtuse angles armed with short spines, placed at further distances than those of the other sorts, and the channels between the angles not near so deep. The flowers are produced from the angles in the same manner as the fifth; but are smaller, and the calyx is of a light

green, without any mixture of colour. The fruit is about the size and shape of a bergamot pear, having many soft spines on the skin; the outside being of a pale yellow, the inside very white, full of pulp, having a great number of small black seeds lodged in it. It frequently flowers in July, and in warm seasons perfects its fruit, which has little flavour in this climate, but is often eaten in the West Indies.

The eighth has the stem upright, slightly nine-angled, thick, and very spiny: the spines, especially the younger ones, have a brownish wool about them: the fruit is of the size and form of a hen's egg, red on the outside and without spines. It is a native of America.

The ninth species has the stem from six to eight feet in height, almost simple, upright, two or three inches in diameter, blunt at the end, having ten deep angles set with thorns, crowded eight or ten together, about an inch in length, spreading, the inner ones shorter and tomentose at the base: the angles at the top have the spines concealed among the wool, and they come out gradually as the stem grows up: the wool is white and brown: flowers sessile, in the very angles of the extremities, scattered; ovate at the base, two inches long, elongated, red: the berry is unarmed, blood red within, and eatable.

The tenth rises with an upright, nine-angled, jointed stem. The joints are sub-ovate, and the spines and down are nearly of equal length.

The eleventh species, when of sufficient strength, produces many exceeding large, beautiful, sweet-scented flowers, of short duration, scarcely continuing six hours full blown, nor opening again when once closed; they mostly begin to open about seven or eight o'clock in the evening, are fully blown by eleven, and by three or four in the morning fade, and hang down in a decayed state; but, during their short continuance, there is scarcely any flower of greater beauty or more magnificent appearance; as the calyx of the flower, when open, is nearly a foot in diameter; the inside being of a splendid yellow colour, appearing like the rays of a bright star, the outside dark brown: the petals are of a pure white; and the great number of recurved stamens that surround the style in the centre of the flower make a fine appearance. The flowers perfume the air to a considerable distance with their fine scent. It may be trained against the walls of the hot-house, where it takes up little room. It usually flowers in July; and when the plants are large, many flowers open the same night, and there is a succession of them for several nights. Sometimes six, eight, or ten flowers open at the same time on one plant,

which have a most magnificent appearance by candle-light; but none of them are succeeded by fruit in this climate. It is a native of Jamaica, &c.

The twelfth produces a greater number of flowers than the above, which come out in May, and sometimes earlier when the season is warm: the petals are of a fine pink colour both within and without; they are not so numerous, and the tube of the flower is longer than that of the other. These flowers keep open three or four days, provided the weather, or the place where the plants stand, be not too warm; and during their continuance make a fine appearance. It has very slender trailing stalks or branches, which require support; they are not jointed, nor do they extend so far as those of the other sort; so that they may be easily trained to a little wooden trellis, and conveyed into the house whilst in flower. The flowers are so beautiful, and in such plenty, as to render it one of the most valuable exotic plants. It does not ripen fruit in this climate. It grows naturally in Peru.

The thirteenth species climbs up trees or other supports to a considerable height, supporting itself by throwing out roots; it also covers shady rocks. The stalks are triangular and jointed: the fruit is the best flavoured of any of the sorts, being slightly acid, with a mixture of sweetness, pleasant and cooling. It has no leaves, but is somewhat irregular with scars. The flowers are large, white, and beautiful. It is a native of the West Indies.

There is a variety in which the fruit is much larger, and of a shining scarlet colour, and which is clothed with leaves that are almost entire.

In the fourteenth species the joints or branches are ovate, compressed, and have very small leaves coming out in knots on their surfaces, as also on their upper edges, which fall off in a short time; and at the same knots there are three or four short bristly spines, which do not appear unless they are closely viewed; but on being handled they enter the skin, are troublesome, and very difficult to get out again. The branches spread near the ground, and frequently trail upon it, putting out new roots, and thus extending to a considerable distance, but never rising in height; they are fleshy and herbaceous whilst young, but as they grow old become drier, of a tough contexture, and have woody fibres. The flowers come out on the upper edges of the branches generally, though sometimes they are produced on their sides, and are of a yellow colour. The skin or cover of the fruit is set with small spines in clusters, and the inside

is fleshy, of a purple or red colour. It flowers here in July and August; but, unless the season is very warm, the fruit does not ripen in this climate. It is a native of America.

The fifteenth has the branches growing more upright than in the above sort, and armed with long bristly spines, coming out in clusters on both the compressed sides, spreading open like the rays of a star. The flowers come out from the upper edges of the leaves, as in the former; but are larger, and of a brighter yellow colour. The fruit is also larger, and of a deeper purple colour; the outer skin is likewise armed with longer spines. It is a native of South America.

The sixteenth species has stronger branches than the above, and armed with larger thorns, which are awl-shaped, whitish, and in clusters. The flowers are large, of a bright yellow colour; and the fruit shaped like that of the above, and of a purple colour. It is a native of South America.

There are varieties which are taller, the branches larger, thicker, and of a deeper green, and armed with strong black spines, coming out in clusters which are far asunder, and which are the largest of all the sorts known. The joints more than a foot long, and eight inches broad; very thick, of a deep green colour, and armed with a few short spines.

The seventeenth species has oblong, smooth, fleshy, jointed, upright branches, rising to the height of eight or ten feet, having scarcely any spines on them, and those few so soft as not to be troublesome when handled. The flowers are small, and of a purple colour, which do not spread open, but appear late in autumn, and the fruit drops off in winter without coming to perfection. It is supposed to be the sort upon which the cochineal insect feeds.

The eighteenth species has thicker, more swelling joints than the other sorts, closely armed with slender white spines. The branches spread out on every side, and where they have no support fall to the ground, very often separating at the joints, and as they lie putting out roots, and forming new plants. This sort rarely produces flowers in this climate. It is called *Pin-pillow*, from the appearance which the branches have to a pincushion stuck full of pins. It is said to be a native of Curassao.

In the nineteenth the branches have the joints much longer, narrower, and more compressed than in any of the others. The spines are very long, slender, and of a yellowish brown colour, coming out in clusters all over the surface of the branches, crossing each other, so as to render the plant dangerous to handle; as, upon being touched, the spines quit the branches, adhere to the hand, and penetrate the skin; the trunk

below the branches being so absolutely covered with spines as to be invisible, and seems nothing but a congeries of them. Hence it has been whimsically named Robinson Crusoe's Coat. Its growth is more upright and lofty than in the other *Opuntias*. The branches are remarkably neat and flatted, seldom subdividing much, but protending horizontally in a double row in the same plane. The spines are very long and slender, in parcels, and have a woolly tuft at their base, which is most evident in the more tender joints.

The twentieth species has very thin branches, which are indented regularly on their edges, like *Spleenwort*; they are of a light green, shaped like a broad-sword, and without spines. The flowers come out from the side, and at the end of the branches, and are of a pale yellow colour. The fruit rarely ripens in this climate. It grows naturally in the Brazils.

The twenty-first has a round stem, ash-coloured, flexible, whence issue several leaves, which at first are very hairy, and afterwards grow to a foot in length, and an inch broad in the middle, decreasing to both extremes; they are of a pale green colour, and have round indentures on their edges; out of these proceed the flowers. The fruit is small and compressed. It is a native of Jamaica.

The twenty-second species is a sessile plant, consisting of globular joints growing out of each other, armed with very long, sharp, subulate spines, commonly solitary, but sometimes coming out two together. The flowers are produced from the upper joint, they are sessile, the tube is long and scaly, the petals spreading and sinuous, the style very long and prominent, and the stigma very broad and many-parted. This is a very singular plant, and the least known of any. It is a native of South America.

The last species has many slender branches, which trail on whatever plants grow near them. These, as well as the stem of the plant, are beset with long whitish spines, which are produced in tufts. The leaves are roundish, very thick and succulent; and the fruit is about the size of a walnut, having tufts of small leaves on it, and within a whitish mucilaginous pulp. It grows in some parts of the Spanish West Indies.

Culture in the Melon-Thistle kind.—The propagation in these plants is effected either by sowing the seeds in pots of light sandy earth, plunging them in the bark-bed; when, after they have advanced a little in growth, they should be pricked out into separate very small pots, replunging them in the bark-bed, where they make great progress, though it is some years

before they acquire any considerable size or growth; or by setting the young plants which issue from the sides of the old ones in pots of the same sort of earth in the spring or autumn, managing them in the same way as those from seed.

But to have large plants at once, they may be procured from the West Indies in tubs of dry compost rubbish, care being taken to guard them from cold and moisture. On their arrival they should be planted in pots, and plunged in the bark-bed till perfectly rooted and become strong.

These plants should be placed upon the tops of the flues or shelves in the stoves in winter, and in the bark-beds in summer; very moderate waterings being given in very hot weather, but none at all in winter, as they are very succulent plants. They are of very singular growth.

Culture in the Cereus, or Torch-Thistle kind.—These plants are increased by planting the cuttings of the branches, which have been laid in a dry place some weeks for the moisture to exhale and the wounded parts to be healed over, in small pots, in the summer season, filled with a compost constituted of one third light earth, the same quantity of sea-sand and sifted lime rubbish, well mixed together, for some length of time, plunging them in the bark hot-bed of the stove, some rather coarse gravel being previously placed in the bottoms of the pots to prevent the stagnation of moisture.

In the upright sorts, the cuttings for this use may be provided by taking off the tops of such kinds as are wanted; the plants afterwards throwing out shoots below, so as to furnish plentiful supplies annually. But in the creeping sorts, as there are various stalks and branches, these may be taken off in cuttings of from three to five or six inches in length, and planted in the same way.

About the middle of August, the plants after being raised in this manner should have air given them by degrees, to harden them against winter, but not wholly exposed to it or the sun, and at the end of September removed into the stove, or green-house, for the winter, during which season they must not have much water. The young plants, for the first winter, should always be placed in a little warmer situation than the older ones, as being more tender.

These plants should constantly have as dry situations as possible in winter, as they imbibe the greatest part of their nourishment from the air, to prevent their roots from rotting; and should not be much exposed in the open air even in summer, unless under shelter, as rains are very injurious to them: nor should the creeping sorts be exposed too much to the open air, even in

the hottest season, if they are designed to flower, but in winter be kept very warm, and have no water given them.

The Great-flowering Creeping Cereus is a tender plant that requires a warm stove to protect it, in which it may be trained against the walls or upon sticks. But the six-angled and the small sort, with pink-coloured flowers, are not so tender, being capable of being preserved in a good green-house, or when placed under a hot-bed frame in winter.

Culture in the Indian Fig kind.—These plants may be readily increased by cuttings of the joints of the branches, taken off and planted in pots of light sandy compost, during the early summer months. These cuttings, previous to planting, should, as in the other sorts, be laid in a dry place ten or fifteen days to heal over the cut parts; and the hot-house kinds, by being then plunged in the bark-bed, or other hot-bed, will be greatly promoted in their rooting; but the green-house sort, or Common Opuntia, readily strikes root without, though it is greatly forwarded by such assistance. They all require the earth to be occasionally moistened a little.

In the summer season they often require water, but it must not be given in large quantities, lest it rot them, and in winter it should be proportioned to the warmth of the stove; as, if the air be kept very warm, they require to be often refreshed, to prevent the branches shrinking; but if kept in only a moderate degree of warmth, little is necessary. The heat in which they thrive best is that marked temperate on botanical thermometers, as, when they are kept too warm in winter, it causes their shoots to be very weak and tender. The sorts which are inclinable to grow upright should have their branches supported with stakes, to prevent their being broken down by their own weight.

Plants of this sort are mostly exposed to the open air in the summer season; but they thrive much better when continued in the stoves, provided they have free air; as, when set abroad, the rains much diminish their beauty, retard their growth, and prevent their producing flowers and fruit in such plenty as when constantly kept in the house.

These are all plants of curious growth, and which afford much variety as well as singularity of effect when introduced among the stove and green-house collections.

CÆSALPINIA, a genus containing a plant of the shrubby exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters of which are: that the calyx is a one-leaved, five-parted perianthium: the tube short: segments oblong, deciduous, the lowest longer than the rest, and slightly arched: the corolla has five petals, inserted into the throat of the calycine tube, unequal: the lamina roundish: the stamina consist of ten filaments, inserted into the throat of the calyx, filiform, woolly at the base, and declining: the anthers are oblong and decumbent: the pistillum is a superior germ, linear-oblong, compressed and attenuated at the base: the style filiform, the length of the stamens: the stigma blunt: the pericarpium is an oblong, compressed, one-celled legume: the seeds few, subovate, compressed, and flat.

The species chiefly cultivated is the *C. pulcherrima*, Beautiful Brasileto or Barbadoes Flower-fence.

This rises with a straight stalk, ten or twelve feet in height; it is covered with a smooth gray bark, and is sometimes as thick as the small of a man's leg; it divides into several spreading branches at the top, armed at each joint with two short strong crooked spines. The leaves are doubly pinnate; leaflets from four to eight pairs, most in the middle, decreasing in number both at top and bottom, three quarters of an inch long, almost half an inch broad at the end, lessening gradually to the base, light green; when bruised emitting a strong odour like savin. The branches are terminated by loose spikes of flowers, which are sometimes formed into a kind of pyramid, and at others are composed more in form of an umbel. The peduncle of each flower is near three inches long. The petals are roundish at the top, but are contracted to narrow tails or claws at their base; they spread open, and are beautifully variegated with a deep red or orange colour, yellow, and some spots of green; they have a very agreeable odour. This is a beautiful plant, and a native of both Indies. It is planted in hedges to divide the lands in Barbadoes, whence it has the name of Flower-fence; and is also called Spanish Carnation, Wild Sena, &c. It flowers here in December, but in its native situation twice in the year.

Culture.—It may be increased by sowing the seeds in the early spring months, in pots filled with good light rich mould, plunging them in a gentle bark hot-bed, watering the earth occasionally to keep it from becoming dry, and shading the plants when up, as well as protecting them well from frosts during the nights. When two or three inches high, they should be set out singly into small pots, being replunged

in the hot-bed, watered, shaded, and protected as there may be occasion. When well rooted, the air should be admitted freely in proper weather. The protection of the stove is necessary during the winter. When the plants are grown large, there must be great care taken in shifting them into larger pots, not to suffer the ball of earth to fall from their roots; as, when this happens, the plants seldom survive it. They are very impatient of moisture in winter; and when damp seizes their tops it often kills them, or at least occasions the loss of their heads.

This is a very ornamental plant in the stove or green-house collections.

CALABASH-TREE. See *CRESCENTIA*.

CALAMUS AROMATICUS. See *ACORUS*.

CALENDULA, a genus comprising plants of the hardy annual perennial flowery and shrubby kinds. The Marigold.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters of which are: that the calyx is common simple, many-leaved, almost upright: segments linear-lanceolate, (fourteen to twenty) nearly equal: the corolla is compound radiate: corollules hermaphrodite, very many in the disk. Females the number of rays in the calyx, very long in the ray: proper, of the hermaphrodite tubular, semiquinquefid, the length of the calyx:—of the female ligulate, very long, three-toothed, villose at the base, nerveless: the stamina consist of (hermaphrodite) five capillary filaments, very short: the anther cylindric, tubular, the length of the corollule: the pistillum hermaphrodite: germ oblong: style filiform, scarcely the length of the stamens: stigma obtuse, bifid, straight. Females: germ oblong, three-cornered: style filiform, the length of the stamens: stigmas two, oblong, acuminate, reflex. There is no pericarpium: the calyx is converging, roundish, and depressed: seeds hermaphrodite central of the disk none: of the circumference seldom solitary, membranous, obcordate, and compressed. Females solitary, larger, oblong, incurved, triangular, with membranous angles, marked on the outside longitudinally with the figure of a vegetable: there is no down: the receptacle is naked and flat.

The species cultivated for use and ornament are: 1. *C. officinalis*, Common Marigold; 2. *C. pluvialis*, Small Cape Marigold; 3. *C. hybrida*, Hybridous or Great Cape Marigold; 4. *C. nudicaulis*, Naked-stalked Cape Marigold; 5. *C. graminifolia*, Grass-leaved Perennial Cape Marigold; 6. *C. fruticosa*, Shrubby Marigold.

The first has a short divaricated stem, di-

viding low into numerous bushy branches a foot or two in height, pubescent and pale green, as well as the leaves; these are long, a little sinuated, the lower and middle ones ovate and blunt, the upper ones lanceolate; the flowers are radiated and of a golden colour, coming out at the ends of the branches. It is a native of France, flowering the greatest part of the summer, the flowers being open from nine in the morning to three in the afternoon.

There are varieties with single yellow flowers, with double yellow flowers; the great, with very double flowers, with single lemon-coloured flowers, with double lemon-coloured flowers, with single and double gold-coloured flowers, with parti-coloured flowers, with reflexed flowers, with proliferous or chiding flowers.

The second species has an annual root; the lower leaves deeply indented on their edges, fleshy and of a pale green colour. The stems declining, from six to eight inches long, leafy to within two inches of the top; the stem-leaves much narrower and more indented than those at the root. The upper part of the stem very slender, upon which stands one flower, shaped like those of the common Marigold, having a purple bottom, with a ray of a violet colour on the outside, and of a pure white within: it opens when the sun shines, but shuts up in the evening, and remains so in cloudy weather. It is a native of the Cape, flowering from June to August.

The third has likewise an annual root; the leaves much longer than in the foregoing, and broader at the end; those near the root are regularly indented, but the stem-leaves have only a few shallow indentures. The stalks are much longer and thicker than those of the ensuing sort; and at the top, just below the flower, swell larger than at the bottom. The flowers are smaller than in the second, but of the same colour. It is a native of the Cape.

The fourth species is also an annual plant, and has much the appearance of the second, but the leaves are more deeply indented on their edges. The stalks grow about the same length as that, and are more naked: the flower is a little smaller, and the rays on the outside are of a fainter purple colour, but white within. It is a native of the Cape, flowering from June to August.

The fifth species is a perennial plant, which divides near the root into several tufted heads, closely covered with long grassy leaves coming out on every side without order; some of these have one or two indentures on their edges, but the most part are entire. From between the

leaves arise naked peduncles about nine inches long, sustaining one flower at the top, which is about the size of the common Marigold, having a purple bottom; the rays are also purple without, but of a pure white within. These expand when the sun shines, but always close in the evening and in cloudy weather. The general season of their beauty is in April and May; but there is commonly a succession of flowers late in the autumn, though not in so great plenty. It is a native of the Cape.

The sixth species has a slender shrubby stalk, rising to the height of seven or eight feet, but requiring support: it sends out a great number of weak branches from the bottom to the top, hanging downwards: the leaves are on short foot-stalks; most of them are slightly indented towards the top, but some are entire; they are of a shining green colour on their upper surface, but paler underneath: the flowers come out at the ends of the branches on short naked peduncles, and are in size and colour like those of the third sort. It is a native of the Cape, flowering during the summer months.

Culture.—The annual sorts may be increased by sowing the seeds in the spring in the borders or other parts where the plants are designed to remain, as they do not bear transplanting well, four or five seeds being put in each patch, which, when they all grow, should be thinned out to two plants in each patch. They afterwards only require to be kept clean from weeds. When the seeds are permitted to scatter, the plants appear more early in the following spring, and flower earlier than those sown at this season. As many of the sorts are liable to degenerate, as the Chiding and the Large Double, where care is not taken in saving their seeds, the surest way to preserve the varieties is to pull up all those plants whose flowers are less double, as soon as they appear, and save seeds from the largest and most perfect flowers: the Chiding variety should be sown by itself in a separate part of the garden, and the seeds saved from the large centre flowers only.

The fifth species may be raised either by seeds or slips taken from the heads. The first is, however, the best method, as they rarely produce good seeds in this climate. In the first mode, the seeds should be sown in the autumn on a bed of fine light mould, in a warm exposure, or in pots filled with the same. In the latter method, the slips may be planted any time in summer, in pots filled with light fresh earth, and plunged into a very moderate hot-bed, to forward their putting out roots; or the pots may be sunk in the ground up to their rims, and co-



Painted by S. Edwards
Calla Aethiopica
 'Aethiopian Calla'

London Published Feb 1186 by G. Kearsley Fleet Street
Coronilla emerus
 'Scorpion Senna'

Engraved by E. Newman

vered with hand-glasses, which, in the middle of summer, answer well, but in the spring or autumn the former method is preferable. After planting, the glasses should be shaded in the heat of the day, and the slips frequently refreshed with water, but not given them too liberally, as much wet rots them. When they have got strong roots they should be planted separately in small pots filled with fresh light earth, and placed in a shady situation till fresh rooted, when they may be placed in the open air, in a sheltered situation, till autumn, and then removed into a dry airy glass-case, or green-house, for the winter season, or under a common hot-bed frame, as they only require protection from frost and wet.

The sixth species may be easily propagated by cuttings, which should be planted in summer in a shady border, or be shaded with mats in the heat of the day: when they have stricken good root they may be carefully taken up, put into separate pots filled with light, poor, sandy earth, and placed in the shade till again well rooted; then put with other hardy exotics in a sheltered situation till frosts appear, when they should be removed into the green-house, placing them so as to have free air.

The single-flowered common sorts are mostly cultivated as pot-herbs for the use of the flowers in broths, or as ornamental plants for the beauty of their flowers, which effect an agreeable diversity in the common borders of pleasure-grounds, in assemblage with other hardy annuals; and the third and fourth species may be made use of in the same way.

The two last sorts, from their continuing long in flower, also afford much variety when set out with other potted plants in the summer, and in the green-house in winter.

CALF'S-SNOUT. See **ANTIRRHINUM**.

CALLA, a genus containing a plant of the herbaceous flowery perennial green-house kind. *Æthiopian Arum*.

It belongs to the class and order *Gynandria Polyandria*, and ranks in the natural order of *Piperitæ*.

The characters are: that the calyx is a one-leaved spathe, ovate-cordate acuminate, coloured at top, very large spreading, permanent: the spadix finger-shaped, quite single, erect, covered with fructifications: there is no corolla: the stamina consist of some filaments intermixed with the germs the length of the pistils, permanent, compressed, truncate: the anthers are simple, truncate, and sessile: the pistillum to each is a roundish obtuse germ: the style simple, very short: the stigma acute: the pericarpium contains as many berries as there

are pistils, four-cornered, globular, pulpy, and one-celled (several-celled): the seeds numerous (six to twelve), solitary, oblong, cylindric, and obtuse at both ends.

The species cultivated for ornament is *C. Æthiopica*, *Æthiopian Arum*, or *Sweet Calla*.

It has thick, fleshy, tuberous roots, which are covered with a thin brown skin, and strike down many strong fleshy fibres into the ground. The leaves arise in clusters, having foot-stalks more than a foot long, which are green and succulent: the leaves are eight or nine inches in length, and of a shining green, ending in a sharp point, which turns backward: between the leaves comes out the scape, which is thick, smooth, of the same colour as the leaves, rising above them, and terminated by a single flower shaped like those of the arum: the hood or spathe is twisted at the bottom, but spreads open at the top, and is of a pure white colour. In the centre of this is situated the spadix or club, which is of an herbaceous yellow colour, upon which the small herbaceous flowers are closely placed; it is only about half the length of the spathe: it is succeeded by roundish red berries. It is a native of the Cape.

Culture.—This plant is readily increased by offsets from the root, which should be separated in the autumn, and planted out singly in pots of light earth, where they become full plants the following year. The plants may be kept in the full air during the summer, but during the winter should have the protection of the green-house or a garden-frame.

These plants, from the singularity of their growth, and their being constantly furnished with leaves, have an agreeable effect, and produce much variety among other potted plants.

CALLICARPA, a genus containing a plant of the deciduous flowering shrubby kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters of which are: that the calyx is a one-leaved perianthium, bell-form: mouth four-cleft and erect: the corolla is monopetalous, tubular: border four-cleft, obtuse, spreading: the stamina consist of four filiform filaments, twice the length of the corolla: the anthers are ovate and incumbent: the pistillum is a roundish germ: the style filiform, thicker at top: the stigma thickish and obtuse: the pericarpium is a globular berry, smooth: the seeds four, oblong, shaped like a meniscus, compressed, callosous.

The only species cultivated is the *C. Americana*.

This is a shrub from three or four to six feet in height; the branches rather compressed; the leaves serrate and acute; the nerves of the upper surface and the whole under surface tomentose; the flowers in axillary, dichotomous, tomentose panicles, scarce the length of the leaves; of a funnel-form and reddish colour, succeeded by a berry the size of a small pea, at first bright red, afterwards deep purple. It is a native of North America.

Culture.—This is easily increased from seeds by sowing them in pots, and plunging them in a moderate hot-bed; when the plants have obtained some strength, gradually inuring them to the open air, into which they may be removed in June, and placed in a sheltered situation till autumn, being kept clear from weeds, and gently refreshed with water in dry weather, but carefully placed under a frame on the approach of frosts, as they are readily destroyed by them.

CALTHA, a genus comprising a plant of the showy perennial kind.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx: the corolla consists of five petals, ovate, flat, spreading, deciduous, and large; the stamina have numerous filiform filaments, shorter than the corolla: the anthers compressed, obtuse, and erect: the pistillum a superior germ, five to ten, oblong, compressed, erect: no styles: the stigmas are simple: the pericarpium consists of many capsules, short, acuminate, spreading, one-celled, two-keeled, gaping in the superior suture: the seeds very many (fifteen), ovate or ovate-oblong, smooth, and affixed to the superior suture in a double row.

The only species is *C. palustris*, Marsh Marigold.

It has a perennial root; the stems are several, almost upright, about a foot high, hollow, nearly round, smooth, branched, and purple at bottom: the radical leaves stand on long petioles, cordate-reniform, smooth, shining, and notched or crenated, sometimes scalloped, sometimes entire: the stem-leaves nearly sessile, more pointed at top, and sharply crenated: the stipules are brown, membranous, and withering: the branches dichotomous, having one large bright-yellow flower at the top of each. It is a native of this climate, flowering in May.

There is a variety with double flowers, which is the sort cultivated for ornament.

The flowers gathered before they expand are said to be a good substitute for capers.

Culture.—This plant is propagated by parting

the roots in autumn, which should then be planted out in a moist soil and shady situation, good room being allowed. The double cultivated sort does not flower so early in the spring as the single, but continues much longer in beauty.

It affords variety in the fronts of beds or borders of pleasure-grounds.

CALYCANTHUS, a genus comprising a plant of the aromatic shrubby deciduous kind.

It belongs to the class and order *Isandria Polygynia*, and ranks in the natural order of the *Rosaceæ*.

The characters of which are: that the calyx is a one-leafed, pitcher-shaped, squarrose perianthium: leaflets coloured, lanceolate; the superior ones gradually larger, resembling petals: there is no corolla, except the calycine folioles, representing petals: the stamina consist of numerous subulate filaments, inserted into the neck of the calyx: the anthers oblong, furrowed, growing to the top of the filaments: the pistillum consists of a great many germs, ending in subulate compressed styles of the length of the stamens: the stigmas are glandulous: there is no pericarpium, the calyx being thickened, obovate, and berried: the seeds are very many and tailed.

The only species cultivated is *C. floridus*, Carolina All-spice.

It rises to the height of eight or ten feet where it grows naturally, but seldom more than four feet high in this country, dividing into many slender branches near the ground; covered with a brown aromatic bark, with two entire leaves placed opposite at every joint on short foot-stalks: the flowers grow single on short peduncles at the extremity of the branches; they have two series of narrow thick petals, which spread open, and turn inward at the top, like those of the starry anemone; these are of a dusky purple colour, and have a disagreeable scent. They appear in May. The strong aromatic scent has obtained it the title of All-spice.

There are varieties with long leaves and with round leaves.

Culture.—This is increased by laying down the young branches, or one-year's shoots, which may be taken off in a twelvemonth, and set where they are to remain, as they do not bear transplanting well afterwards. The effects of drying winds should be guarded against in the summer, and frosts in winter; the former by very moderate waterings, and the latter by coverings of bark. The best season for laying down is the autumn, and for planting out, the spring.

This shrub is capable of bearing the open air, but requires a dry soil and warm exposure.

It is very ornamental in the fore parts of clumps



Painted by Syd Edwards
Calycanthus floridus
 1 *Carolina Allspice*

London Published Jan 1868 by G. Kearns Fleet Street
Colutea arborescens
 2 *Common Bladder Lenna*

Engraved by F. S. Lee
Ceanothus Americanus
 3 *New Jersey Tea Tree*



Painted by J. G. Smith

Engraved by J. G. Smith

Published by J. G. Smith

Campanula rapunculoides
Nettle-leaved Campanula

Crepis barbata
Yellow Hawkweed

Convolvulus tricolor
Small blue Convolvulus

or borders in shrubbery and other ornamented grounds.

CAMELLIA, a genus comprising a plant of the large evergreen exotic kind for the greenhouse.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a many-leaved perianthium, roundish, imbricate; the scales roundish, very blunt, the inner ones gradually larger, concave, and deciduous: the corolla consists of five petals, obovate, coalescing at the base: the stamina have numerous erect filaments, coalescing below into a crown larger than the style, above unconnected, shorter than the corolla: the anthers are simple: the pistilum is a roundish germ: the style is subulate, the length of the stamens: the stigma acute and reflex: the pericarpium is a turbinate woody capsule, marked with some furrows: the seeds are kernels, equal in number to the streaks of the capsule, roundish, and often filled with smaller seeds.

The species cultivated is *C. Japonica*, Japan Rose.

It has a tree-like stem, branching upwards to a considerable height in its native situation: the bark is ash-coloured; branches round and smooth: the leaves are alternate, ovate, evergreen, shining on both sides, thick and stiff, paler green beneath, on short petioles: the flowers coming out from the sides of the branches are large, spreading, and roseaceous, being succeeded by a ligneous capsule inclosing a sort of nut.

There are varieties with single red and purple flowers, with double red and purple flowers, with single white flowers, and with double white flowers.

It is in high estimation with the Japanese for the elegance of its large flowers, which exhibit a great variety of colours, but have no scent, as well as for its evergreen leaves. It flowers in its native climate from October to April, and is also a native of China.

Culture.—It is capable of being increased both by layers and cuttings, but the former is the best method. The branches may be laid down in the autumn, and be taken off in the May following, and planted out in pots, which should be plunged in a moderate hotbed.

In the latter mode the young shoots may be cut in the early spring, and planted in pots of light earth, plunging them in a slight hotbed.

When planted out in the open ground it should have a warm southern aspect against a wall,

and be well protected from frosts during the winter.

CAMOMILE. See **ANTHEMIS**.

CAMPANULA, a genus comprising various plants of the annual, biennial, and perennial herbaceous flowery kind. The Bell-flower.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanuceae*.

The characters are: that the calyx is a five-parted perianthium, acute, erect-expanding, superior: the corolla is monopetalous, bell-form, impervious at the base, half-five-cleft, marcescent: divisions broad, acute, spreading: the nectary in the bottom of the corolla, composed of five valves, acute, converging, covering the receptacle: the stamina consist of five capillary filaments, very short, inserted on the tips of the valves of the nectary: the anthers are longer than the filaments, and compressed: the pistilum is an angular inferior germ: the style filiform, longer than the stamens: the stigma three-parted, oblong, thickish: divisions revolute: the pericarpium is a roundish angular capsule, three- or five-celled, emitting the seeds at so many lateral openings: the seeds are numerous and small: the receptacle is columnar and adnate.

The species mostly cultivated for the purposes of ornament and use are: 1. *C. persicifolia*, Peach-leaved Bell-flower; 2. *C. pyramidalis*, Pyramidal or Steeple Bell-flower; 3. *C. Carpathica*, Carpathian or Heart-leaved Bell-flower; 4. *C. latifolia*, Broad-leaved Campanula, or Giant Throat-wort; 5. *C. Trachelium*, Great Throat-wort, or Nettle-leaved Campanula; 6. *C. grandiflora*, Great-flowered Bell-flower; 7. *C. medium*, Small Pyramidal Campanula, or Canterbury Bells; 8. *C. Speculum*, Venus's Looking-glass; 9. *C. Americana*, American Bell-flower; 10. *C. fruticosa*, Shrubby Cape Bell-flower; 11. *C. Rapunculus*, Esculent Rampion.

There are other species in this extensive genus deserving of attention.

The first has the root like that of Navew, and eatable: the stem is very straight, eighteen inches high and more, (in gardens two feet and a half,) unbranched, angular, smooth, as is the whole plant: the flowers are in a thin spike, one or two together, on very long peduncles, which have two stipules at the base: the corolla is large, broad bell-form, deep blue; the segments short, and moderately acuminate. It is a perennial plant, native of most parts of the continent of Europe, flowering in June and July.

There are varieties with single blue and white flowers, and with double blue and white flowers.

The second species, as it appears in the gar-

den, has thick tuberous roots, which are milky; these send out three or four strong, smooth, upright stalks, which rise near four feet high, and are garnished with smooth oblong leaves, whose edges are a little indented: the lower leaves are much broader than those on the stalks: the flowers are produced from the side of the stalks, and are regularly set on for more than half their length, forming a sort of pyramid; these are large, open, and shaped like a bell, and mostly of a light-blue colour.

There are varieties with white flowers and with double flowers.

The third affords a milky juice when wounded: the root is whitish and perennial; the stems herbaceous, annual, weak, hardly branching, bearing one or very few flowers. In gardens it becomes branching and many-flowered. The root-leaves are kidney-form, roundish; the peduncle elongated and smooth; the corolla blue. It flowers the whole summer, and is a native of the Carpathian Alps.

According to Mr. Curtis, it is still scarce in gardens, but deserves to be more known and cultivated: its flowers are in proportion to the plant, being large and showy.

The fourth species has the stem three feet high and more, angular and smooth, but not branching: the leaves are sharply serrate, on short petioles, and hirsute: the flowers are axillary, one or two together, on peduncles shorter than the leaf: calyx smooth, with broad triangular segments: corolla very large, blue; the segments triangular, divided by a line: the fruit obliges the peduncle to bend down with its weight. It is a native of the northern parts of the island, flowering in July.

There are varieties with single and double purple, and with single and double white flowers; with single and double pale-red flowers; and with striped flowers.

The fifth species has a perennial root: the stems are from two to three feet in height, upright, stiff, hairy, angular, the angles membranaceous, putting out a few short side-branches: the leaves resembling those of the great nettle, but rather shorter and broader, alternate, ovate, cordate, pointed, hairy, deeply toothed, sometimes having two or three lobes; petioled, except the upper ones, which are sessile: the peduncles are alternate, axillary, trifid, and three-flowered. The number of flowers, however, varies from one or two to three, four, and even five; they are large and nodding. It is a native of most parts of Europe, &c. flowering in July and August.

There are varieties, with single and double blue flowers, with single and double white

flowers, and with single and double pale purple flowers.

The sixth species has the whole plant very smooth; the root perennial, white, fusiform, the thickness of a finger, and branched: the stems are few, erect or ascending, simple, round, a foot high, leafy all over, annual, terminated with one handsome flower, but without scent, nodding a little, with sometimes one or two flowers more from the upper axillas: the leaves are irregularly scattered, sessile or on very short petioles, ovate or sub lanceolate, short and sharply serrate: sometimes a few of the leaves, and at others all of them, are in threes: the corolla is two inches in diameter or more, very deep blue, with numerous blue veins; elegantly pear-shaped before expanding, and at first green. It flowers in June and beginning of July, and is a native of Siberia.

The seventh has a biennial root: the leaves are oblong, rough, hairy, serrate, coming out without order from the root, narrowing into a petiole. From the centre of these, the second season, arises a stiff, hairy, furrowed stalk about two feet high, sending out several lateral branches, with long, narrow, hairy, serrate, sessile leaves, placed alternately: from the setting on of these leaves come out the peduncles, those on the lower part of the stem and branches four or five inches long, diminishing gradually in length upwards, and thus forming a sort of pyramid. The flowers are very large, and make a fine appearance; they are smooth, and the segments turn back at the end; they come out the beginning of June, and, if the season be not very hot, continue a month in beauty. It grows naturally in Germany, &c.

There are varieties, with blue, purple, white, striped, and double flowers.

The eighth species is an annual plant, which rises with slender stalks a foot high: the flowers are of a beautiful purple, inclining to a violet colour, (sometimes pale purple or white,) and in the evening fold up into a pentagon figure, whence it is sometimes called *Viola pentagonia*: the calyx is composed of five narrow leaves, which spread open, turn back, and are much longer than the petals; these remain on the top of the prismatic seed-vessel, which is filled with small angular seeds: the stem is tender, quadrangular, naturally procumbent, branched from the bottom at very great angles: the leaves sessile, obovate, and waved about the edge: the flowers axillary, erect, on very long peduncles: the corolla wheel-shaped, and so deeply five-cleft that the segments, which are ovate, scarcely cohere.

It is a native of the southern countries of Europe, flowering from May to September.

C A M

There are varieties, with bright blue flowers, with white flowers, and with pale purple flowers.

The ninth species has an annual root; the stem and germs smooth; the leaves acuminate; the flowers three or more from each axil or bracte; the corollas small; the style longer than the corolla. It is a native of Pennsylvania, flowering in July.

There are varieties, with single white, with single blue, and with double blue flowers.

The tenth is a shrubby ornamental plant, a native of the Cape of Good Hope, flowering here in August.

In the eleventh species the whole plant is full of a milky juice: the root is biennial, spindle-shaped, sometimes branching: the stem upright, angular, two feet high, hairy towards the base, smooth above: branches alternate, short, upright: the leaves towards the base of the stem hairy above or on both sides, blunt; the upper ones smooth, and becoming gradually more pointed; obscurely notched: teeth glandular, whitish, not projecting beyond the edge of the leaf: there is an awl-shaped bracte at the base of each peduncle: the segments of the calyx are awl-shaped, or setaceous, twice as long as the germ, with a small tooth on each side of the base: the flowers are upright: the corolla blueish purple, sometimes very pale purple or whitish; each segment marked with three lines: the nectary fringed. It grows wild in France, &c., flowering in June, July, and August.

The fleshy roots are eatable, and are much cultivated in France for sallads.

Culture.—The plants in this extensive genus are mostly hardy, and increased with little difficulty. The six first sorts, and their varieties, are all capable of being raised by dividing the roots in the autumn or early spring, and planting them out on the beds, borders, or other parts. The former is, however, the better season for the purpose, as the roots become better established before they begin to shoot up into stem. They thrive in almost any soil or situation. As the plants of the steeple bell-flower, trained for adorning halls and chimneys, are seldom proper for the purpose the following season after being planted out, a supply of young plants should be annually raised. And though this is mostly done by offsets, as being the quickest mode, the plants raised from seeds are always stronger; the stalks rise higher, and produce a greater number of flowers, especially where good seeds can be procured.

In the fifth sort, especially with the double varieties, the parting their roots should be an-

C A N

nually performed in the autumn, otherwise the plants are apt to degenerate to single, and the soil should not be too light or rich in which they are planted, as in either of these cases they degenerate. In a strong fresh loam their flowers are in the greatest perfection.

The broad-leaved sort is also easily propagated by seeds, which it furnishes in great plenty.

In all these sorts, when not sown in the places where they are to remain, the plants should be transplanted into such situations, in the beginning of the autumn, as by that means they flower much better.

The seventh and eighth kinds are increased by seeds, which should be sown in the spring, on beds of common earth, keeping them clean from weeds till the following autumn; when they may be transplanted into the borders or other parts. And as the plants in the first of these sorts perish the second year, young ones should be annually raised.

The latter of these kinds are mostly sown in patches in the borders or clumps, among other hardy annuals, at the above period; but if sown in autumn the plants grow much taller, and flower much earlier.

The ninth sort is propagated by planting the offsets from the roots in the beginning of the autumn, in beds, or other places, where they are to remain. And the tenth species may be increased by planting the cuttings of the shoots in pots of light earth, and plunging them in the hotbed of the stove.

The eleventh kind is raised from seed, which should be sown in April in a moist shady situation, the plants being thinned out to five or six inches distance. The roots are ready for use about the beginning of autumn. It requires to be sown annually.

All the hardy flowering sorts are highly ornamental in the borders of pleasure-grounds and other parts, as they continue long in flower. And the tender kinds afford variety in the greenhouse.

CAMPION. See **AGROSTEMMA.**

CANARINA, a genus containing a plant of the exotic greenhouse kind. The Canary Bell-flower.

It belongs to the class and order *Herandria Monogynia*, and ranks in the natural order of *Campanaceae*.

The characters are: that the calyx is a superior perianthium: leaflets six, lanceolate, recurved and permanent: the corolla is monopetalous, bell-form, six-cleft, nerved: the nectary of six valves, equal, distant, covering the receptacle: the stamina have six subulate filaments, spreading outwards, originating from the valves:

The anthers are pendulous from the tip: the pistillum is an inferior, six-cornered germ: the style conical and short: the stigma longer than the stamens, clavated, six-lobed: the pericarpium is a six-angled, obtuse, six-celled capsule: the seeds are numerous and small.

There is only one species introduced into cultivation, *C. campanulata*, Canary Bell-flower.

It has a perennial root, tuberous-fusiform; the stem is three feet high, erect, solitary, round, even with swelling joints: the branches by three from each joint; the upper ones longer, dichotomous at the end, with alternate branchlets; the leaves on the stem in threes, on the branches opposite, petioled, hastate, toothed and even, veined: the flowers proceed from the forks of the upper branches solitary, peduncled and drooping: the corolla is larger than the leaves, resembling that of crown imperial, rufous, brighter within, with a yellow eye; each segment with three purple nerves. It is a native of the Canary islands, flowering from January to March.

Culture.—It is capable of being increased by parting the roots with caution not to break them, as, when this happens, a milky juice exudes, and renders them liable to rot. In such cases they should be laid in the greenhouse a few days to heal. The roots must not be too often parted, as it weakens the plants, and prevents them from flowering well. The best time for this is in July, soon after the stalks decay. The earth, in which they are planted, should not be rich, as that will render the plants too luxuriant in branches, but poor in flowers: they succeed best in a light sandy loam, with a fourth part of screened lime-rubbish. It requires the protection of a greenhouse in the winter, and the assistance of occasional slight waterings, but only shade in the spring season when set abroad. It has a fine effect when in the greenhouse, or in assemblage with other plants in full flower.

CANDLEBERRY TREE. See MYRICA.

CANDY-TUFF. See INERTS.

CANE. See ARUNDO.

CANELLA, a genus affording a plant of the exotic tree kind, for the stove.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of the *Meliæ*.

The characters are: that the calyx is a one-leaved, three-lobed perianthium, the lobes roundish, and concave: the corolla has five petals, oblong, sessile, longer than the calyx, two a little narrower than the rest: the nectary

pitcher-shaped, the length of the petals, and anther-bearing: the stamina have no filaments: the anthers are twenty-one, linear, parallel, distinct, fastened on the outside to the nectary: the pistillum is a superior germ, within the nectary, ovate: the style cylindric, the length of the nectary: the stigmas two, blunt, convex, and wrinkled: the pericarpium is an oblong berry, three-celled: the seeds roundish-kidney-shape (two to four), in pairs, cordate.

There is only one species, *C. alla*, Laurel-leaved Canella, or White Cinnamon.

In its native situation it is a tree, the stem of which rises from ten to fifty feet in height, very straight and upright, being branched only at the top, but here only a shrub: the bark is whitish, by which it is easily known: the branches are erect, and not spreading: the leaves are petioled, alternate, but not regularly, oblong, pointed, entire, without any distinct nerves or veins, dark green, of a thick consistence like those of laurel, and shining: the flowers grow at the tops of the branches in clusters, but upon divided peduncles, are small, seldom open, and of a violet colour; they are succeeded by a fleshy, smooth, black berry.

It is a native of the West-Indies, and the whole tree is very aromatic, when in blossom perfuming the air all around.

Culture.—This plant is best raised by sowing the seeds procured from its native situation, in pots, in the autumn or spring seasons, and plunging them in a moderate hot-bed of bark; being sparingly watered in winter, but more freely in the summer season, and air freely admitted in mild warm weather. In this way the plants often succeed very well. They seldom take well by either layers or cuttings.

They require to be constantly kept in the bark-bed of the stove.

CANKER, a disease with which fruit- and forest-trees are liable to be attacked. It is a sort of vegetable gangrene, by which the bark becomes rough and scabby, and the affected woody part of a brown rusty colour. It ultimately destroys the trees, when not removed by proper means.

It has been suggested by Mr. Knight as being more liable to attack such trees as have been propagated for a great length of time by ingrafting, as being continuations of the old trees, only nourished by new stocks; and of course to be a disease of old age, somewhat similar to that of mortification in the extremities of persons in the decline of life. The author of the Philosophy of Gardening, however, considers it as more probable to be a hereditary

disease, from the buds of trees being a lateral progeny, and consequently having a more exact resemblance to their parents, being thereby "more liable to the diseases gradually acquired or increased by the influence of soil or climate;" not having the probability of improvement, as in those propagated in other modes.

The disease is, however, capable of being produced in other ways. It is very apt to be induced in different sorts of trees by the destruction of the bark, by external violence, as a blow of the spade where digging is performed without sufficient caution.

In apple-trees Mr. Forsyth has found it very liable to be caused by the want of due attention in pruning, the leaving of the foot-stalks of the fruit on the trees; and certainly by the bruises produced by ladders in gathering the fruit. Too tight nailing, from the pressure of the shreds on the shoots. The wetness of the autumn season, by preventing the young wood from becoming well ripened, when succeeded by sharp frost, often produces the disease, from the young shoot being destroyed and left on the trees. Their being left in this way has likewise much tendency to promote its increase. It is also suggested that the buds' being eaten and destroyed by birds or insects produces the same consequences.

Mr. Forsyth well remarks, that by leaving the dead wood on the trees during the summer, the disease is infallibly brought on; and that when it is continued for years they are wholly destroyed. He advises their being cut off the latter end of April, or in the following month, when their progress can be ascertained, and to perform the operation three, four, or more buds below the seemingly diseased part, as the affection often extends much further in the heart of the shoot, than it seems to do on the outside. The cutting should be carried so far down that the rusty colour disappears, and there is only the sound white wood.

Some contend that this disease is produced in all sorts of trees, solely by the quality of the soil, as where it is of the sour clayey, shingly, or gravelly kind; but Mr. Forsyth found that in these, though he allows that fruit-trees succeed best in mellow loams, the roots were not in the least affected where the branches were very greatly diseased. It is asserted that the canker constantly proceeds from the branches and stem to the roots, but never in the contrary direction.

When trees are very much affected in consequence of large wounds, it is advised, by the above writer, to pare off all the infected parts of

the bark with a draw-knife; and as the inner white bark is frequently diseased, having a dotted appearance, it should likewise be wholly removed, as, when any is left, it extends itself afresh. And when the trunk is become hollow it is recommended to round out the decayed parts, and then to apply the composition which he has recommended in a liquid state, with a brush, over the parts from which the cankered bark or dead wood has been removed, shaking the powder of wood-ashes and burnt bones over it. In this way the disease will soon be removed, and the hollow trunk in time filled up.

But when the stem is greatly decayed it is necessary to open the earth, and remove all the rotten parts completely; then filling up the parts with a mixture of the composition and clay, as used in grafting, to within a few inches of the surface ground, forcing it well in by treading, the surface being made sloping from the tree, to convey off the wet. The whole should then be made level with mould.

After having managed the old wounded parts in this way, the old bark is advised to be examined, and, when found wrinkled or cracked, on the outside, pared off with a draw-knife, and the composition applied as above; which produces a fine smooth bark underneath it, the plaster with the old bark peeling off in the succeeding winter or spring; at this time, all the old bark remaining in the hollows, being removed by a wooden or bone knife. After this, the parts from which the bark has been scraped off should be thinly coated over with a liquid composed of cow-dung, soap-suds, and urine. This remains till the new bark is formed, when it is discharged of itself, during the summer or following spring, leaving a fine new smooth bark. The same operation may be repeated in the ensuing spring if there should be occasion; by which the whole of the old diseased bark may be sloughed off, and the tree kept in a fine healthy state and perfect order.

In the prevention of this vegetable affection, much care is necessary in the pruning and other management of the trees. All the ends of diseased shoots should invariably be removed, as well as the old fruit-stalks and dead stubs cut away. The appearance of gum on the stems or branches of trees indicates their being attacked with the canker.

Common white paint is sometimes made use of as an application for the removal of canker. When this substance is employed, Dr. Darwin has suggested that it may probably be rendered more destructive to insects,

C A N

by combining a quarter of an ounce of muriated quicksilver with a pound of the paint.

CANNA, a genus containing plants of the herbaceous perennial exotic kind. The Indian Flowering Reed, or Indian Shot.

It belongs to the class and order *Monandria Monogynia*, and ranks in the natural order of *Scitamineae*.

The characters are: that the calyx is a three-leaved perianthium: the leaflets lanceolate, erect, small, coloured, and permanent: the corolla is monopetalous, six-parted; the divisions lanceolate, conjoined at the base, the three outer ones erect, larger than the calyx; the three inner ones larger than the outer; two erect, one reflected, and thus constituting the upper lip: the nectary is petal-like, two-parted, of the length and figure of the petals; the upper division ascending, the inferior revolute, imitating the lower lip of a corolla: the stamina have no filaments: the anthers are linear, growing to the upper margin of the division which bears the nectary: the pistillum is a roundish germ, rugged, inferior: the style is single, ensiform, growing to the anther-bearing nectary, lanceolate, of the length and figure of a petal: the stigma is linear, growing to the margin of the style: the pericarpium is a roundish, rugged capsule, crowned, three-grooved, three-celled, and three-valved: the seeds are few, and globular.

The species mostly cultivated are; 1. *C. Indica*, Common Indian Flowering Rush; 2. *C. glauca*, Sea-green-leaved Flowering Rush.

The first has a thick, fleshy, tuberous root, which divides into many irregular knobs, spreading wide near the surface of the ground, sending out many large ovate leaves without any order; these at their first appearance are twisted like a horn, but afterwards expand and are near a foot long, and five inches broad in the middle, lessening gradually to both ends, and terminating in points. They have many large transverse veins running from the midrib to the sides, which are prominent on their under side; and between each of these run two smaller, parallel, pointed veins, which are peculiar to this species. The stalks are herbaceous, rising four feet high, encompassed by the broad leafy foot-stalks of the leaves; these are compressed on two sides: at the upper part of the stalk the flowers are produced in loose spikes, each being at first covered by a leafy hood, which afterwards stands below the flower, and turns to a brown colour. Each flower has one petal, which is cut almost to the bottom into six slender segments, the three upper broadest; these are of a pale red colour; the flower is encompassed by a three-

C A P

leaved calyx, which sits upon a small, roundish, rough germ, which, after the flower is fallen, swells to a large fruit or capsule, oblong and rough, having three longitudinal furrows, and is crowned by the three-leaved calyx of the flower which remains. When the fruit is ripe, the capsule opens lengthways into three cells, which are filled with round, hard, black, shining seeds.

It is a native of America, flowering from June till August.

There are varieties with red flowers, with scarlet flowers, with yellow flowers, and with spotted flowers.

In the second species the roots are much larger than in the first sort, and strike down strong fleshy fibres deep in the ground. The stalks rise seven or eight feet in height. The leaves are near two feet long, narrow, smooth, and of a sea-green colour. The flowers are produced in short thick spikes at the extremity, are large, and of a pale yellow colour; the segments of the petal are broad, but their shape like those of the other sort. The seed-vessels are larger, and much longer than those of the other sort, but contain fewer seeds, which are very large. It is a native of New Spain.

Culture.—These plants are always increased by sowing the seeds in pots of good earth, in the spring, plunging them into a hot-bed; and when the plants are a little advanced in growth, they should be pricked out separately, in small pots of rich earth, replunging them in the hotbed, giving shade, water, and fresh air, hardening them by degrees till they bear it fully. In the autumn the first sort should be placed in the stove, and the other in a good greenhouse.

Some of the varieties also succeed in the greenhouse method.

These plants afford variety in the stove and greenhouse, and have a good effect when in flower.

CANTERBURY BELLS. See *CAMPANULA*.

CAPE JASMIN. See *GARDENIA*.

CAPER. See *CAPPARIS*.

CAPPARIS, a genus containing a plant of the shrubby exotic kind for the greenhouse. The Caper-Shrub.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Putamineae*.

The characters are: that the calyx is a four-leaved coriaceous perianthium: the leaflets are ovate, concave, and gibbous: the corolla has four obtuse petals, spreading very large: the

stamina consist of numerous filiform patulous filaments: the anthers are oblong, versatile, inclined: the pistillum is a pedicelled germ: there is no style: the stigma is obtuse and sessile: the pericarpium is a corticose, one-celled, pedicelled berry: the seeds numerous, reniform, and nestling.

The species chiefly cultivated is *C. spinosa*, Prickly Caper-Shrub.

It is a low shrub, generally growing out of the joints of old walls, the fissures of rocks, and among rubbish, in its native situations: the stems are woody, and covered with a white bark; they are trailing, round, smooth, and branching; branches alternate, spreading, often downy and leafy: the leaves are alternate, on short foot-stalks, spreading, oval or roundish, in the wild plant often terminated by a little sharp point, which disappears by culture, entire, veiny, succulent, bright-green, and deciduous; according to some, four times as long as the foot-stalks: the flowers are white slightly tinged with red, numerous, axillary, solitary, large, and handsome, but inodorous. It grows wild in the southern parts of Europe; and Dr. Smith remarks it as extraordinary, that this beautiful shrub, so common in the south of France, and which grows so luxuriantly in the open air, trained against walls even at Paris, should scarce be capable of being made to flower, except with great care, in the stove with us.

The flower-buds, produced in great plenty on the wild plant, are used as a pickle.

There is a variety, in which the leaves are sharper at the ends.

Culture.—These plants are raised with some difficulty in this climate, as in their native situations they grow in horizontal directions from the fissures of rocks or other places.

They are increased either by seeds or layers, but the first is the method mostly employed, the seeds being procured from abroad. In the seed method they should be sown in the early spring in pots filled with a compost of sand, fresh mould, and rubbish, plunging them in a tan hotbed; and, when the plants are of sufficient growth, removing them into separate pots.

In the latter mode the young branches should be laid down in the early spring or summer by slightly slitting them; and when they have taken good root, which is often a considerable length of time before it is effected, they should be removed into separate pots, and placed in the tan hotbed. The roots obtained from the importers are likewise planted for the purpose of raising these shrubs in the spring or early summer months.

These plants flower best when placed in the

stove during the winter season, though they will succeed under the protection of the greenhouse. They require a pretty free admission of air and sun when the weather is fine; but the waterings should be sparing, especially in the winter months.

The plants are very ornamental and curious in the stove or greenhouse.

CAPSICUM, a genus affording plants of the herbaceous annual and shrubby perennial exotic kind. Guinea Pepper.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridie*.

The characters are: that the calyx is a one-lobed, five-cleft, erect, permanent perianthium: the corolla is monopetalous, rotated; tube very short: border half-five-cleft, spreading, plaited; divisions broad and acute: the stamina consist of five subulate filaments, very small: the anthers are oblong and converging: the pistillum is a superior ovate germ: the style filiform, longer than the stamens: the stigma obtuse: the pericarpium is a berry without pulp, approaching to an ovate form, bilocular, hollow, and coloured: the receptacles growing to the dissepiment, exsuccous: the seeds are very many, reniform, and compressed.

The species cultivated are: 1. *C. annum*, Herbaceous Annual Capsicum, or Guinea Pepper. 2. *C. grossum*, Heart-shaped Capsicum, or Bell Pepper. 3. *C. baccatum*, Small-fruited Capsicum, or Bird Pepper. 4. *C. frutescens*, Shrubby Capsicum.

In the first the stem is herbaceous, annual, two feet high, upright, and branched; the branches short and ascending; the leaves are ovate-lanceolate, quite entire, smooth, dark-green; the flowers white, lateral, and solitary; the fruit is a berry or pod, varying much in size and shape, extremely smooth and shining on the outside, beautiful scarlet or yellow, inflated or hollow, two-celled, sometimes three-celled; the partitions at top commonly failing towards the axis. It is a native of the West Indies.

It varies extremely in its fruit, as in the Long-podded annual kind, with oblong, pendulous or hanging scarlet pods; with oblong, pendulous, yellow pods; with upright, oblong, scarlet pods; with short upright pods; with divided pods; and with long very taper pods; all which often rise from the same seed of the Common Long-podded, Red or Yellow Capsicum, rarely altering from one to the other in colour, only in the size and position of their growth.

In the Heart-shaped kind, with both red and yellow fruit; with roundish, heart-shaped, hanging pods; with oblong, heart-shaped, hanging

pod: with heart-shaped upright pods; with round, heart-shaped, upright pods; and with very large, roundish, upright pods.

In the Angular-heart-formed kind, with upright, angular, heart-shaped, furrowed and wrinkled scarlet pods; with upright, angular, heart-shaped, flat-topped, scarlet pods; and with upright, angular, bell-shaped scarlet pods.

And in the Great Angular Pickling kind, there are varieties with upright, swelling, fleshy-skinned, wrinkled red pods, flattened and angular at top; and with hanging or pendulous pods.

The Cherry-fruited variety has low spreading branches, leaves in clusters, and round, smooth, red, cherry-shaped fruit.

And the Olive-shaped variety has an erect branchy head, and olive-shaped fruit.

The second species has much resemblance to the annual kind, and seems to be the connecting link between the herbaceous and shrubby sorts; the stem is perennial, a span in height, and somewhat branching; the fruit, in proportion to the plant, is very large, being almost as big as an apple, but differing in shape; it is solitary and erect, from an inch and half to two inches long, swelling and wrinkled, flattened and angular at top.

The third differs but little from the fourth; the stem is more tender, more shrubby, and not roughish; the berries are very small, red, of an ovate form, and of the size of currants; the branches are divaricated, not spreading out at a right angle with the stem. It is a native of the West Indies.

It is gathered when ripe; and, after being dried and pounded, constitutes Cavan Pepper.

The fourth species has the stem three feet high and rugged; branches diffused, frequently scandent; the leaves are lanceolate, quite entire, waved, small, smooth, petioled, alternate, or scattered: the flowers are axillary, small, white, five- or six-cleft: the fruit is at first green, but, when ripe, golden- or saffron-coloured, crooked, and shaped like a horn, an inch long, and usually solitary.

Culture.—They are all capable of being easily raised from seed on a hotbed in the early spring months, which, after it has been prepared, should have the glasses put on, and five or six inches depth of rich light earth laid over the surface; the seed should then either be sown over it in small drills, or in pots plunged in the mould, in the first mode covering it in about a quarter of an inch deep: when the plants appear air should be given daily by tilting up the lights, as well as frequent moderate waterings; and when two or three inches high, and they have three or four leaves, it is of advantage to

prick a quantity of them out upon another hotbed, at from four to six inches distance, giving water and shade occasionally till rooted; after which air should be freely admitted every fine day, and moderate waterings two or three times a week, hardening the plants gradually to the full air, into which they should be removed the beginning of June, with a ball of earth to each root, placing them in different parts of the flower-borders, either in the full ground or in pots, watering them in dry weather till they have taken good root. Such as are intended to produce fruit for pickling should be planted out in a rich warm border, or other place, in the kitchen-garden, in rows a foot and a half or two feet distant, and at about fifteen inches distant in the rows, water being given as before.

The shrubby sorts, after being raised from seeds, as above, should be pricked out singly in small pots, and plunged into another hotbed, under frames and glasses, air and water being given; and when they are considerably advanced in growth, removed, with balls to their roots, into larger pots, &c. plunging them in a bed of moderate warmth under a deep frame, where they may remain to have occasional shelter till autumn; then they must be taken in their pots to the stove, where the fruit has a fine appearance in the winter.

The annual kinds are considered not only as plants of ornament, from their flowers; but the beauty of the ripe fruit, which, from being numerous, and of various forms, sizes, positions of growth, and colours, blended with the green leaves and the white flowers, have a fine effect in the latter part of summer, either in the borders and clumps in open places, or in pots in fore-courts and other compartments about the house.

For useful purposes the young or half-grown fruit is esteemed as a fine pickle; all the sorts may be used for this purpose, but the great angular-podded kind, or Bell Pepper, should be preferred.

The shrubby sorts, as just observed, have a fine effect in the autumn and winter in the stove, from their ripe fruit, which often remains on the plants till the approach of spring.

CARAWAY. See CARUS.

CARDAMOMUM. See AMOMUM.

CARDINAL-FLOWER. See LOBELIA.

CARDOON. See CYNARA.

CARICA, a genus comprising plants of the curious exotic hothouse kind. The Papaw Tree.

It belongs to the class and order *Diœcia Decandria*, or rather *Polygamia*, and ranks in the natural order of *Tricoccæ*.

The characters of which are: that in the male the calyx is scarce manifest; it has, however,

five very short sharp teeth: the corolla is mono-petalous, funnel-form: the tube slender, very long, gradually slenderer downwards: the border five-parted, divisions lanceolate-linear, obtuse, obliquely and spirally revolute: the stamina consist of ten filaments, in the top of the tube of the corolla; the five alternate ones inferior: the anthers are oblong, fixed to the filaments on the inner side.

In the female, or rather the hermaphrodite, the calyx is a very small, five-toothed, permanent perianthium: the teeth ovate, acute, spreading: the corolla is five-parted; parts lanceolate, sharp, erect below the middle, but reflected and twisted above: the stamina consist of ten filaments, five alternate, shorter, subulate, all united by a membrane at the base: the anthers are ovate, erect, two-valved, and fertile: the germ ovate: there is no style: the stigmas three or five, broad, flat-expanding, multifid: the segments very short and blunt: the pericarpium is a very large berry, angulated with three or five furrows, unilocular, and fleshy: the seeds are numerous, ovate, green, very smooth, tunicated, nestling in the middle of the berry.

The species are: 1. *C. papaya*, Common Papaw Tree; 2. *C. posoposa*, Dwarf Papaw Tree.

The first rises with a thick, soft, herbaceous stem, to the height of eighteen or twenty feet in its native situation, naked till within two or three feet of the top, and having marks of the fallen leaves great part of its length: the leaves come out on every side the stem upon very long foot-stalks; those which are situated undermost are almost horizontal, but those on the top are erect: these leaves (in full-grown plants) are very large, and divided into many parts (or lobes) which are deeply sinuated, or cut into irregular divisions. The stem of the plant, and also the foot-stalks of the leaves, are hollow in the middle. The flowers of the male are produced from between the leaves on the upper part of the plant on every side; they have peduncles near two feet long, at the ends of which the flowers stand in loose clusters, each having a separate short pedicel; these are of a pure white, and have an agreeable odour. Sometimes these are succeeded by small fruit, about the size and shape of a Catherine Pear. The flowers of the female Papaw also come out between the leaves, toward the upper part of the plant, upon very short peduncles, singly, sitting close to the stem; they are large and bell-shaped, composed of six petals, which are commonly yellow, but those of the pyramidal sort purple: when these fall away, the germ swells to a large fleshy fruit, the size of a small melon, of different forms, some being angular, and compressed at both

ends; others oval and globular, and some pyramidal. The fruit, when half ripe, is here sometimes used as a pickle instead of mango; and the tender foot-stalks of the female tree preserved as a sweetmeat.

It is a native of America.

There are varieties in the female, with melon-shaped fruit, with gourd-shaped fruit, with pear-shaped fruit, and with pyramidal fruit.

The second species, according to Brown, seldom rises above four or five feet in height. It differs from the other in having a branching stalk, the lobes or divisions of the leaves being entire, and in the fruit being shaped like a pear; of different sizes; yellow within and without, and of a sweet flavour; the flower of a rose-colour, and divided only into five parts.

Culture.—These plants are easily increased by seeds, which should be sown on a hotbed early in the spring; and when the plants are about two inches high, removed into separate small pots filled with light, mellow, loamy soil, being plunged into a bark hotbed, carefully shading them till they have taken root.

In the autumn they should be placed in the stove, but little water given during the winter, as they are apt to be injured by moisture. Great care is also necessary, in shifting them from small pots into larger ones, to preserve the whole ball of earth to their roots; as, when they are left bare, they rarely survive. As the plants advance in growth they must be removed into larger pots.

These are very ornamental plants in the stove at almost all seasons, but the fruit seldom ripens so fully as to be eaten.

CARNATION. See DIANTHUS.

CAROB-TREE. See CERATONIA.

CAROTA. See DAUCUS.

CARPINUS, a genus furnishing plants of the hardy deciduous forest-tree kind. The Hornbeam.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that the male flowers are disposed in a cylindric ament: the calyx is a common ament, on all sides loosely imbricate, consisting of scales, ovate, concave, acute, ciliate, uniflorous: there is no corolla: the stamina consist of, generally, ten very small filaments: the anthers are didymous, compressed, villose at the tip, and bivalve.

The female flowers are disposed in a long ament, upon the same plant: the calyx is a common loosely imbricate ament, consisting of lanceolate scales, which are villose, reflected at the tip, and uniflorous: the corolla is calyciform,

monophyllous, six-cleft; two of the divisions larger than the rest: the pistillum consists of two germs, very short, two styles on each, capillary, coloured, long: the stigmas simple: no pericarpium: the ament becoming very large, concealing the seed at the base of each scale: the seed is a nut, ovate and angular.

The species are: 1. *C. Betulus*, Common Hornbeam; 2. *C. Ostrya*, Hop Hornbeam; 3. *C. Virginiana*, Flowering Virginian Hornbeam.

The first rises with a straight upright stem to a considerable height, feathered from the bottom, and terminating in a branching bushy head: the leaves are ovate, acuminate, sharply serrate, strongly nerved, bright-green, smooth, three inches or more in length, and near two in breadth, standing on round petioles, slightly pubescent, half an inch in length, and having ovate red glandules at their base. They begin to open about the end of March, and are usually quite out by the middle of April. They wither in autumn, but remain on the branches till spring. This has lately been considered chiefly as a shrub, and cultivated for under-wood, and in the nurseries for planting as hedges.

There are varieties, with pale-green leaves, with variegated leaves, with cut leaves, and the Oriental Hornbeam.

The second species rises with an upright stem twenty feet in height, terminating in a rough head: the leaves are elliptic, acuminate, doubly-toothed, nerved, the nerves ferruginous. The female fruits resemble hops, but are formed of inflated scales, closed on every side, villose at the base, including a bilocular seed.

It sheds its leaves in winter, with the elm and other deciduous trees. It was first observed in Italy, and is very common in Germany. This is of quicker growth than the common sort.

The third grows to the height of thirty feet or more, with an upright stem, and is of quicker growth than either of the former sorts; it sheds its leaves, which are spear-shaped, pointed, and rough, in autumn, about the same time with the elm; and during the time of its verdure makes a good appearance, being well clothed with leaves, which are of a deep, strong, green colour, resembling the long-leaved elm.

Culture.—All the sorts may be raised from seed sown in autumn, in beds, covering it an inch deep: the plants sometimes rise in the spring, and sometimes not till the spring following; the seeds may likewise be preserved till the beginning of the year, and then sown in February. When the plants have had two years' growth in the seed-bed, they should be planted out in the nursery, in rows two feet and half distant, and eighteen inches in the rows, keeping them

clean; and when from three to six or eight feet high they are fit for being finally planted.

They are also capable of being raised by layers laid down in autumn, which in twelve months will be ready to take off and plant out. This is the best way to continue the different varieties distinct; but for timber-trees the new method is the best, as the trees continue longer.

All these are hardy trees, and will prosper in almost any soil or exposure.

The first kind flourishes not only in good but any hungry barren soil, light or stiff, and in hilly, bleak, exposed places. It may also be planted as a forest tree, for ornament in parks, either singly, in clumps, or large plantations, in assemblage with others of the deciduous kind; and as it retains its leaves, in a withered state, during the winter, it affords shelter to less hardy trees, and is, of course, adapted to border plantations. It is likewise well adapted for hedges, either by way of ornament or shelter, as it is feathered to the bottom, and capable of being readily trained. And the other sorts are proper for large ornamental plantations to increase the variety and effect: the oriental kind is well adapted for low close hedges.

CARROT. See DAUCUS.

CARTHAMUS, a genus comprehending plants of the annual and perennial herbaceous flowery kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ*.

The characters are: that the calyx is common ovate, imbricate; scales numerous, contracted below, increased at the tip by a foliaceous appendicle, which is subovate, flat, spreading, obtuse: the corolla is compound uniform, tubular; corollets hermaphrodite, equal; the proper one monopetalous, funnel-form; border five-parted, erect, subequal: the stamina consist of five capillary filaments, very short: the anthers are cylindric and tubular: the pistillum is a very short germ: the style filiform, longer than the stamens: the stigma simple: there is no pericarpium: the calyx converging: the seeds are solitary: the receptacle is flat, pilose, hairs longer than the seed.

The species are: 1. *C. lanatus*, Yellow Distaff Thistle, or Woolly Carthamus; 2. *C. caeruleus*, Blue-flowered Carthamus, or Bastard Saffron; 3. *C. Tingitanus*, Tangier Carthamus; 4. *C. arborescens*, Tree Carthamus.

The first is an annual plant, perishing soon after the seeds are ripe: the lower leaves spread flat upon the ground; these are five or six inches long, narrow, and deeply indented on both sides; they are hairy, and have a few soft spines on

their edges: the stalk rises about two feet high, covered with hairs, and garnished with oblong hairy leaves, which embrace it, and are deeply sinuated, with sharp thorns growing on their edges; the upper part divides into many branches, which have leaves of the same form, but smaller: the flowers are produced at the end of the branches, having a cluster of stiff, hard, prickly leaves below the scaly calyx, which contains many yellow florets, succeeded by oblong angular seeds. It flowers in June and July, and is a native of the South of France, &c.

The second species rises with a single stalk about two feet high, of a purplish colour, hairy and channelled, closely beset with broad spear-shaped leaves, sharply serrate, and covered with a short hairy down: the stalk is terminated by a single large head of blue flowers, having a scaly calyx composed of two orders of leaves; the outer broad, long, and armed with sharp spines on their edges; the inner narrow, and terminated by a sharp thorn. It flowers in June and July, and grows naturally in Spain, &c.

The third has a perennial root: the stalk rises about a foot and a half high, seldom putting out any branches: the leaves the whole length of the stalk are narrow, spear-shaped, deeply serrate, each of the serratures ending in a sharp point; those next the root being entirely pinnate, but the stem-leaves pinnatifid: the stalk is terminated by one large scaly head of blue flowers. It is a native of Barbary.

In the fourth species the whole plant is pubescent; the stem firm, from eight to ten feet in height, and evergreen: the leaves are stem-clasping, ensiform or lanceolate, a foot long, pinnatifid-sinuate, toothed, mostly spinous at the end, with a white rib: the flower is terminal, one or two, sessile, yellow, and sweet-smelling. It is a native of Andalusia.

Culture.—The first sort may be increased by sowing the seeds in the autumn in any open situation; these plants require no further culture but to keep them clean from weeds, and sufficiently thin.

The second and third sorts may be propagated by parting the roots, which for the former should be performed in autumn, when the leaves decay. In a light soil it endures the cold of our winters, and continues many years: it may also be raised from seeds, as in the first, which ripen in this climate in dry seasons. For the latter, the best time is about the beginning of March. It should have a dry soil and a warm situation, otherwise it is liable to be destroyed in severe winters.

The last sort, as it does not ripen seeds in this climate, is only capable of being increased by

side-shoots slipped from the branches in the spring, and planted in pots filled with light sandy earth, plunging them into a moderate hotbed, and shading them till they have taken root; they should then be gradually hardened, and removed into the open air, and when sufficiently strong, some planted in a warm dry border, and others in pots, to be sheltered in winter from frost.

These plants have a good effect in mixture with others of the flower kind in borders and clumps.

CARUI. See *CARUM*.

CARUM, a genus containing a plant of the biennial herbaceous aromatic kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal long umbel: rays ten, frequently unequal: umbel partial crowded: involucre universal, often monophyllous; partial none: the perianth scarcely manifest: the corolla is universal uniform: the florets of the disk abortive: proper unequal: petals five, unequal, obtuse, carinated, inflex-emarginate: the stamina consist of five capillary filaments, the length of the corolla, caducous: the anthers roundish and very small: the pistillum is an inferior germ: styles two, very small: the stigma simple: there is no pericarpium: the fruit ovate-oblong, striated, bipartite: seeds two, convex on one side, and ovate-oblong, striated, flat on the other.

The only species is *C. Carui*, Common Caraway.

It is a biennial plant, which has a taper root like a parsnep, but much smaller, running deep into the ground, sending out many small fibres, and having a strong aromatic taste. The whole plant is smooth; the stems are solid, channelled, from eighteen inches to two feet and upwards in height, with spreading branches: the leaves decompound, long and narrow, on long petioles, leaflets in sixes, in a sort of whorl, two of them longer; segments terminating in a reddish semi-transparent substance. The flowers are in umbels, and of a white colour.

It grows naturally in this country, and flowers in May and June.

The young roots are sometimes eaten as parsneps, and the tender leaves boiled in soup. The seeds are well known to be used in cakes, and incrustrated with sugar for comfits.

Culture.—It is increased by sowing the seeds in the autumn, either on the surface or in narrow drills, raking them in. When the plants appear they should be thinned out to six or seven inches, and kept perfectly free from

weeds. It succeeds best on a mellow loamy soil.

CARYOPHYLLUS, a genus containing a plant of the aromatic exotic kind for the stove. The Clove-tree.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Hesperideæ*.

The characters are: that the calyx is a perianth of the fruit superior, quadripartite, acute, small, and permanent: the perianth of the flower superior, tetraphyllous; leaflets roundish, concave, deciduous: the corolla consists of four petals, roundish, crenate, smaller than the calyx of the flower: the stamina have numerous capillary filaments: the anthers are simple: the pistillum is an inferior oblong germ, large, terminating in the calyx of the fruit: the style simple, inserted into the quadrangular receptacle: the stigma simple: the pericarpium is oval, unilocular, terminated by the hardened converging calyx of the fruit, and umbilicate: the seed single, oval, and large.

The only species is *C. aromaticus*, Clove-tree.

It rises, in its native situation, to twenty or twenty-five feet high, dividing, four or five feet from the ground, into branches, which grow erect, covered with a smooth bark, and subdivided into many smaller, garnished with oval-spear-shaped leaves, placed opposite; and small white flowers terminating the branches in loose bunches, succeeded by oval berries, crowned with the permanent calyx. The berries, gathered when half grown and dried, constitute the cloves employed in culinary uses.

Culture.—It is raised by sowing the ripe seeds, procured from abroad, in pots filled with boggy earth, and plunged in a hotbed. When the plants are come up they should be removed to the bark-bed in the stove, where they must be constantly kept.

CASSIA, a genus containing plants of the herbaceous shrubby and tree kinds. Wild Senna.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Leguminosæ*.

The characters are: that the calyx is a pentaphyllous perianthium, lax, concave, coloured, and deciduous: the corolla has five roundish concave petals; the inferior ones more distant, more spreading, larger: the stamina consist of ten declined filaments; the three inferior ones longer; the three superior shorter: the three inferior anthers very large, arcuate, rostrate, gaping at the tip; the four lateral ones without the rostrum gaping; the three superior ones very small and sterile: the pistillum is a subcolumnar germ, long, peduncled: the style very

short: the stigma obtuse and ascending: the pericarpium is an oblong legume, partitions transverse: the seeds many, roundish, affixed to the superior suture.

The species mostly cultivated are: 1. *C. Marylandica*, Maryland Herbaceous Cassia; 2. *C. fruticosa*, Shrubby Cassia; 3. *C. villosa*, Villose-leaved Cassia; 4. *C. emarginata*, Emarginate Cassia, or Jamaica Senna Shrub; 5. *C. fistulans*, Cassia Tree, or Pudding-pipe Tree; 6. *C. arborescens*, Tree Cassia; 7. *C. Javanica*, Java Cassia.

The first has a perennial root, composed of a great number of black fibres, sending out in the spring several upright stems, four or five feet high, dividing into many branches pointing obliquely upwards: the leaflets from six to nine pairs, but most commonly eight, and sometimes an odd leaflet: the flowers (two or three together) from the axillas of the upper leaves, and in loose spikes at the end of the stem, which hang down before they open, but are afterwards erect. They are of a pale yellow colour. It is a native of North America.

The second species in its native situation grows upwards of twenty feet high, with several stems covered with brown bark, and dividing into many branches at top: the leaves have two pairs of leaflets, which in the lower ones are oval; but those of the upper five inches long, and two and a half broad in the middle, smooth, and of a light-green: the flowers are produced in loose spikes at the extremity of the branches; are large, of a gold colour, and succeeded by taper brown pods about nine inches long. It is a native of La Vera Cruz.

The third species in its native state rises with a woody stem to the height of fourteen or sixteen feet, sending out many lateral branches: the flowers come out in loose bunches at the ends of the branches, are of a pale straw-colour, and small: the pods are long, narrow, and jointed, each seed being lodged in a sort of isthmus. It is native of Campeachy.

The fourth is a small shrubby tree, with a trunk ten or twelve feet high, and subdivided, round, ash-coloured, pubescent branches: the leaves pinnate, scattered, spreading. The flowers are in racemes, of a yellow colour, irregular, and succeeded by flat pods. It flowers in spring, and is a native of Jamaica.

The fifth species is a tree which rises to the height of forty or fifty feet, with a large trunk, dividing into many branches: the leaflets are equal at the base, having many transverse nerves, and the midrib is very prominent on the under side: the flowers are produced in long spikes at the end of the branches, each standing upon a

pretty long peduncle; they are of a deep yellow colour, and are succeeded by cylindrical pods, from one to two feet long, having a dark-brown woody shell. It is a native of the East and West Indies.

The sixth in its native state rises with a strong upright trunk to the height of twenty-five or thirty feet, dividing into many branches covered with an ash-coloured bark: the leaves are on long foot-stalks, composed of two pairs of leaflets, four inches long, and near two broad, smooth, of a dark-green on their upper side, but paler underneath. The flowers are produced sometimes from the side of the stalks, where they are few and scattering; but the ends of the branches have large round bunches of flowers, which branch out from one centre; they are of a deep yellow inclining to orange-colour, and are succeeded by compressed pods, near nine inches long, having a border on each side. It is native of La Vera Cruz.

The seventh species rises to a great magnitude, with a large trunk, dividing into many branches: the leaves are very long, composed of twelve or fourteen pairs of smooth leaflets, of a light-green, and placed near together: the flowers come out in loose spikes at the ends of the branches; they are of a pale carnation colour, and succeeded by large cylindrical pods two feet long, and the thickness of a slender arm. It is sometimes called *Horse Cassia*, and is a native of the East Indies.

Culture.—The first sort may be raised by seeds, or by slips made from the roots. In the first mode, the seeds should be sown in the beginning of April, either in pots under the protection of a frame, or on a warm border where the soil is of a dry sandy quality, and covered in lightly. They are usually procured from America. When the plants are sufficiently strong, as in the beginning of the autumn, they should be removed into other pots of larger sizes, or planted out in the borders where they are to remain, as this sort is capable of succeeding in the open air. The slips may be planted out either in the full ground, or in pots, in the early autumn or in the spring, as above; a little water and shade being given till they become perfectly rooted.

The three following shrubby sorts are likewise increased by sowing the seeds procured from their native situations, in the early spring, in pots of light sandy earth, plunging them in a moderate hotbed. When the plants have attained a sufficiently strong growth they should be removed into separate small pots, replunging them into a bark hotbed in the stove, air being rather freely given, and proper shade as well as water occasionally. These should be constantly

kept in the stove, as they are much injured by being placed in the open air, even in the summer season, but some of them will answer well in the greenhouse.

The last three sorts, which are of the tree kind, are increased in the same manner as the above, and require the same sort of management.

When retained in the stove, many of them flower and ripen seeds in the autumn, producing a fine effect; and, from their not losing their leaves, afford variety in the winter. It is observed by Martyn, that all the species contract their leaves in the evening as the sun declines, and open them again as it rises; and that "the under surface of the leaflets is turned outward, the upper surfaces being clasped close together." But "most plants whose under surface is thus turned outward grow on dry sandy land, where the roots do not find a sufficient supply of moisture; the lower surface of the leaves being generally covered with a short soft down that retains the nightly dews and inhales them." Those plants which have the upper surface of the leaves turned outwards do not stand in need of this supply; and of course that surface being smooth, the moisture is cast off and not imbibed.

CASSINE, a genus comprehending plants of the evergreen shrubby exotic kind for the greenhouse. *Hottentot-Cherry*, or *Cape Phillyrea*.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a quinquepartite inferior perianth, very small, obtuse, and permanent: the corolla is quinquepartite, and spreading: divisions subovate, obtuse, larger than the calyx: the stamina consist of five subulate filaments, spreading: the anthers are simple: the pistillum is a superior conic germ: there is no style: the stigmas three, reflex, and obtuse: the pericarpium is a roundish trilocular berry, umbilicated with the stigmas: the seeds are solitary and subovate.

The species cultivated are: 1. *C. Capensis*, Cape Cassine, or Phillyrea. 2. *C. Maurocinia*, Great Hottentot Cherry.

The first has a woody stalk, which in this climate seldom rises more than five or six feet high, sending out many branches, covered with a dark purplish bark; the leaves are stiff, opposite, about an inch and half long, and a little more in breadth, of a light-green, on short foot-stalks: the flowers are produced in roundish bunches from the side, and at the end of the branches; are white, and have five small petals spreading open, being succeeded by red-berried fruit. It is a native of the Cape.

The second species rises to a considerable height.

where it grows naturally, but here it is rarely more than five or six feet high. The stalk is strong, woody, and covered with a purplish bark, sending out many stiff branches. The leaves are very thick, for the most part opposite, about two inches long and almost as broad, of a dark green colour. The flowers come out from the side of the old branches in clusters, three, four, or five together, on one common slender peduncle; are first greenish yellow, but changing to white. They are succeeded by large red cherry-like fruit. It is a native of the Cape.

Culture.—These plants, as they do not produce ripe seed in this climate, must be increased either by layers or cuttings, but the first is the best method.

The layers should be made from the young shoots near the root, which, as they take root with difficulty, should be twisted in the part laid down, and the business performed in the autumn.

With cuttings, the best practice is to take the shoots of the preceding year, which should be cut with a little of the old wood to them, and planted in the early spring, in pots filled with a rather mellow, loamy earth, plunging them in a hot-bed, kept close and shaded, taking care that very little water be given at the time.

They take root much more readily in the former than the latter method; requiring one year in the first, and generally two in the second before they are well rooted.

When they have become well rooted they should be taken off, and removed into separate small pots, being shaded till well re-established, and then placed in a warm sheltered situation during summer, but taken under the protection of the greenhouse before the approach of frosts in the autumn. They require water rather freely in the hot season, but very sparingly in winter; and air should be admitted freely when the weather is suitable.

They are very ornamental in the greenhouse, from their stiff evergreen leaves, and the fine appearance of the fruit.

CASSIOBERRY-BUSH. See VIBURNUM.

CATALPA. See BIGNONIA.

CATANANCHE, a genus containing a plant of the herbaceous perennial flowery kind. Candia Lion's-foot.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ*.

The characters are: that the calyx is common imbricate, turbinate; leaflets very many, loosely incumbent, acute, scariose; the squamule ovate-acuminate, concave, lax, glossy and permanent: the corolla is compound, generally

imbricate, uniform; corollets hermaphrodite, very many; the exterior ones longer.

Proper monopetalous, ligulate, linear, truncate, five-toothed: the stamina consist of five capillary filaments, very short: the anthers are cylindric, and tubular: the pistillum is an oblong germ: the style filiform, length of the stamens: the stigma bifid and reflex: there is no pericarpium: the calyx unchanged: the seeds solitary, turbinate-ovate: down from a five-awned calycle: the receptacle is chaffy.

The species chiefly cultivated is *C. cærulea*.

It is perennial, sending out many long, narrow, hairy leaves, which are jagged on their edges. Between the leaves the flower-stalks come out, which are in number proportioned to the size of the plant; as from an old thriving root there are frequently eight or ten, and young plants seldom send out more than two or three. These stalks rise near two feet high, dividing into many small branches upward, with leaves like those below, but smaller, and have few or no jags on their edges; each of the peduncles is terminated with single heads of flowers, of a blue colour, having a dry, silvery, scaly calyx.

It is a native of the south of Europe, flowering from July to October.

There is a variety with double flowers.

Culture.—It is increased by sowing the seeds in the early spring, on the borders where the earth is light: the plants when sufficiently strong may, some of them, be removed into pots; but they flower best when left where sown. The double sort is best increased by slipping the roots and planting them out either in the early autumn or spring seasons; but in this way the roots should not be divided into too small parts, as that prevents their sending up a sufficient number of stalks for flowering.

These are very ornamental plants for the borders or clumps, where sufficiently dry, warm, and protected, as they continue several years.

Some plants may likewise be preserved in pots, to set out in assemblage with other potted plants.

CATECU. See ARECA.

CATERPILLAR, a well known highly destructive insect to various sorts of trees and plants.

There are several different kinds; but those that are the most destructive to vegetables and fruits in the garden are the yellowish green, the black, and the dark rough-skinned leathery kinds. The first is generated from the ova of the white butterfly deposited upon the leaves and other parts of the plants. The second sort mostly show themselves in March, when the weather is dry, upon trees of the pear, apple, and other kinds, sometimes contained in large webs.

They deposit their ova on the leaves, and in the crevices of the bark of the trees, from which new insects are generated during the summer months. Mr. Hit supposes some of them to remain in these situations during the winter; having found them in nail-holes and under pieces of old bark in February. The last sort is generated in the middle of the inclosed leaves of different sorts of plants, such as those of the Cabbage, Brocoli, and other similar kinds. These produce much mischief by eating through the stems and other parts of the plants.

Doctor Darwin observes that there are two breeds of these insects in the year, the *larvæ* of the first devouring the spring leaves, and those of the second the summer shoots.

Various methods have been attempted for destroying the different sorts of caterpillars, both such as are destructive to esculent plants and to trees of the fruit kinds. With the first, much advantage may be gained by careful attention in picking them off from the leaves or other parts of the plants on their first appearance. The beds or other places where the vegetables grow should also be carefully examined early in the mornings, in order to destroy them before they retire into the holes and crevices that conceal them during the day-time. And as they are in general the most prevalent when the weather is dry, it seems not improbable but that considerable benefit may be obtained by watering the plants frequently, both with common water, and such liquids as contain ammonia or volatile alkali, either from the effects of such waterings on the caterpillars themselves, or from their promoting the growth of the plants in so vigorous and rapid a manner as to render them incapable of being devoured by them.

Mr. Forsyth advises, that during the winter and spring months, every *chrysalis* that can be discovered, either under the copings of walls, on gates, or palings, and about the caves, doors and windows of houses, should be completely removed and destroyed.

Where caterpillars abound, all the leaves that are affected should be removed with care, and swept up in order to be destroyed by fire, or formed into a compost with other substances.

The ten-threaded caterpillar is eagerly sought after by birds, and is capable of being easily destroyed; but, when neglected, the ova are deposited in great abundance in the latter part of summer, as about July, on the undersides of the leaves, in rows, with little white specks, and quickly hatched on account of the heat of the season, the young caterpillars coming forth in swarms to destroy the autumnal leaves. At

this season they may be picked off the infected leaves, and their generation be by that means prevented.

Bushes or plants that are much affected with caterpillars one year, are extremely liable to be attacked with them afterwards.

In the second case, or with fruit-trees, "the best method of preventing them from being infested is, according to Mr. Forsyth, to scrape the stems with a piece of bone or wood made in the form of a knife, taking care not to bruise the bark; and afterwards to wash the tree and wall with an equal quantity of soap-suds and urine mixed;" and "as soon as the leaves are off the trees in autumn, they should be raked and swept up; then carried to the melon-ground, and mixed up with other leaves and dung for hot-beds:" by this means a great number of eggs of insects that are deposited on the under-sides of the leaves may be got rid of. Afterwards all the stems of the trees, and all the ends of the buds, should be washed, taking care not to hurt the buds: "in doing this, it is observed, that what falls will destroy the slugs that take shelter on the offset of the wall and in the borders, before they are dug for planting lettuce, endive, &c. This washing should be repeated about the beginning of February, which will destroy any eggs of different insects that may still remain about the trees. A painter's brush may be used for laying the mixture on the trees, and a soft broom, or a brush made of the ends of garden matting, for washing the wall. The matting seems preferable, as, being soft and flexible, it will enter the holes and crevices." And "the mixture that falls on the border and offset of the wall, in this second washing, will destroy those slugs and insects that made their appearance early. The stems and branches of the trees may be washed two or three times, or oftener, in the spring, before the buds begin to swell; but the branches must not be rubbed after the trees come into flower; they may, however, be sprinkled over with the mixture from a watering-pot with a rose just before the buds begin to open, but by no means after they are open; as it will, by its glutinous nature, render the bloom liable to be scorched by the sun." These washings, &c. are recommended "for all trees, standards as well as those on walls; particularly apple, cherry, and plum-trees." Where any caterpillars remain, they may "be discovered by the curling of the leaves; for every curled leaf has one or more caterpillar, or other insect, in it: such leaves should therefore be carefully pulled off, and the insects crushed; as, when

neglected, they frequently devour every leaf, leaving the tree quite naked, and of course destroy the fruit for that season at least.

In order to remove the gregarious sorts of caterpillars, which are enclosed in great numbers in nets or bags resembling strong cobwebs, and fixed to the branches of trees or shrubs, the nests should be carefully picked off, and the insects crushed, by which vast numbers of them may be destroyed. After the trees have been thus cleared, they should be washed as above to destroy those stragglers that may still remain on them. But "after the trees come into flower, instead of washing them with urine and soap-suds, they should be well watered with clear lime-water mixed with tobacco-water."

It is remarked by Mr. Forsyth, that as "there are several species of moths, that in the caterpillar state are very hurtful to plums and other fruit-trees," it would "be a great advantage to destroy them on their first appearance. In clearing trees from insects of other kinds, caterpillars should also be carefully looked for and picked off. They will be found to "shelter themselves at the ends of the shoots, in the flowers, and at the bottom of the footstalks of the flowers." It is added that "there are two or three sorts that infest fruit-trees, two of a brown and one of a green colour."

The success of this method of clearing and washing has been very evident in the practice of Mr. Forsyth in different sorts of apple-trees, they recovering themselves afterwards in a rapid manner.

It has long been a common opinion that cold and severe frost have considerable effects in destroying caterpillars, as well as the larvæ and ova of different insects: but the experiments of Reaumur and Bonnet seem to show that this is not the case; as, on the former subjecting "a parcel of young caterpillars to a degree of cold lowered to fifteen degrees below zero on his thermometer, Dr. Anderson observes, they suffered no injury; and the latter found the same to be the case with the common cabbage caterpillar, and also the *chrysalis* of the common butterfly.

It is ingeniously suggested, by Mr. Forsyth, that by a better and more intimate acquaintance with the habits and economy of these animals, we might, probably, be enabled to discover more certain methods of destroying them.

CATESBÆA, a genus containing a plant of the exotic shrubby kind. The Lily-Thorn.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Luridæ*.

The characters are: that the calyx is a four-toothed, superior perianthium, very small, acute, and permanent: the corolla is monopetalous, funnel-form: tube extremely long, straight, gradually widening upwards: border semi-quadrifid, broad, erect-flat: the stamina consist of four filaments, growing within the neck of the tube: the anthers oblong, erect, almost longer than the corolla: the pistillum is a roundish, inferior germ: the style filiform, length of the corolla: the stigma simple: the pericarpium an oval berry, crowned, unilocular: the seeds many, angulate.

The species cultivated is *C. spinosa*, Lily-Thorn.

It rises with a branching stem to the height of ten or twelve feet, covered with a pale russet bark: the branches come out alternately from the bottom to the top, with small leaves resembling those of the box-tree, in clusters all round the branches, at certain distances: the flowers come out single from the sides of the branches, hanging downward; and are of a dull yellow colour. The berry is the size of a middling plum, hollow within, with small angular seeds. It is a native of the Bahama islands, flowering here in the summer.

Culture.—It is capable of being propagated either by seeds, or cuttings of the young shoots. The seeds, procured from abroad, should be sown in pots of light earth, in the early spring months, and plunged in the bark-bed. The cuttings may be planted at any time during the summer months, in pots, plunging them in the tan-bed; and when closely covered with hand-glasses, their rooting is facilitated. It is a very ornamental shrub; but must be always kept in pots of light sandy earth, in the stove.

CAULIFLOWER. See **BRASSICA**.

CEANOTHUS, a genus comprising plants of the tree and shrubby exotic kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a one-leaved, turbinate perianthium; border five-parted, acute, close-converging, and permanent: the corolla has five equal petals, roundish, of an arched saccular shape, compressed, very obtuse, spreading, smaller than the calyx, seated on claws the length of the petal, growing from the interstices of the calyx: the stamina consist of five subulate, erect filaments, opposite to the petals, the length of the corolla: the anthers are roundish: the pistillum is a superior, triangular germ: the style cylindric, semutrifid, the length

of the stamens: the stigma obtuse: the pericarpium is a berry (capsule), dry, three-grained, three-celled, obtuse, retuse, and set with tubercles: the seeds solitary and ovate.

The species commonly cultivated are: 1. *C. Americanus*, American Ceanothus, or New Jersey Tea; 2. *C. Asiaticus*, Asiatic Ceanothus; 3. *C. Africanus*, African Evergreen Ceanothus.

The first in this climate is a shrub, which seldom rises more than three or four feet high, sending out branches on every side from the ground upwards: the branches are very slender, and, as it is pretty late in the spring before they begin to shoot, keep growing very late; consequently, unless the autumn proves dry and mild, the tender shoots are often killed down very low by the early frosts; but in favourable seasons, the extreme parts of the shoots only are injured by the cold: these branches are garnished with oval-pointed leaves, placed opposite, deciduous, and of a light green colour: the flowers are produced at the extremity of each shoot in close thick spikes, and composed of five small petals, of a clear white colour, making a fine appearance, as the whole shrub is covered over with flowers.

These appear in July, and in mild seasons again in October. It is a native of North America, where the leaves are sometimes used as tea.

The second species rises with a shrubby branching stem, four feet high. The branches are alternate, flexuose, striated and smooth: the leaves are alternate, resembling those of the pear, acuminate, smooth, at the ends of the small branches, scarcely an inch in length, on petioles half the length of the leaves: the racemes from each axilla usually two, small, the length of the petioles, consisting of many florets, on very short pedicels, caducous, one often remaining which bears fruit: hence the raceme is tooth-letted from the falling of the flowers, which are of a greenish colour: the berries are large. It is a native of Ceylon, &c.

The third species rises to the height of ten or twelve feet, with a woody stem, covered with a rough dark-coloured bark, and sends out many weak branches, which hang downwards: these while young are green, but afterward change to a purplish colour: they are garnished with oblong pointed leaves, of a lucid green, smooth, and slightly serrate on their edges: the flowers are small, of an herbaceous colour, coming out from the side of the branches; sometimes appearing in July, but not succeeded by seeds in this climate, nor do the plants often produce flowers; being chiefly preserved for the beauty of their shining evergreen leaves. It is a native

of the Cape, and sometimes known by the title of *Alaternoides*.

Culture.—This, in the first sort, may be effected either by seeds or layers. In the first mode the seeds should be sown, as soon as procured, in pots of light earth, lightly covered in, placing them in a frame, to have occasional shelter in bad weather; and in spring plunge them in a hot-bed to bring up the plants, hardening them gradually to the full air in summer, but in autumn removing them to have shelter until the following spring, when they should be planted out in separate small pots, or in a nursery-bed in the full ground, being covered occasionally again in the following winter, as they require protection from severe frost the two or three first years of their growth.

In the latter method, some of the youngest branches should be laid down in autumn, in the usual way, which become rooted in twelve months, and in the spring after should be planted out. Some of the first young shoots may also be laid down during the summer, in order to have the greater chance of success.

In the second species the propagation may be effected by seeds, which should be sown in pots of light earth, plunging them in the bark-bed, and likewise by laying the young shoots down in the autumn, plunging the pots as above: the plants afterwards should be managed as other woody exotics of the stove.

The third sort is raised expeditiously by laying down the young shoots, either in their own pots, or others placed for the purpose, in the autumn. They are also capable of being increased by young cuttings, planted in the spring in pots, plunging them in the bark- or other hot-bed about two months. They afterwards require only the ordinary culture of greenhouse plants.

The first is an elegant little flowering shrub, for the more conspicuous compartments of the shrubbery, being planted in a moderately dry soil and sheltered situation, in the fronts of the clumps or borders.

The second affords variety in the stove; and the third is worthy of a place in the greenhouse collection, for the beauty of its shining green leaves.

CEDAR, *Barbadoes*. See CEDRELA.

CEDAR, *Bermudas*. See JUNIPERUS.

CEDAR, *Carolina*. See JUNIPERUS.

CEDAR, *Lebanon*. See PINUS CEDRUS.

CEDAR, *Lycian*. See JUNIPERUS.

CEDAR, *Phœnician*. See JUNIPERUS.

CEDAR, *Virginian*. See JUNIPERUS.

CEDAR, *White*. See CUPRESSUS.

CEDRELA, a genus containing a plant of the exotic tree kind for the stove. Bastard Cedar.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that the calyx is a monophyllous campanulate perianthium, very small, five-toothed, and withering: the corolla is funnel-form, pentapetalous; the tube bellied below: the petals linear-oblong, obtuse, erect, adjoined to the receptacle at one-third beneath: the stamina consist of five subulate filaments seated on the receptacle, shorter than the corolla: the anthers are oblong, bent outwards at the tip: the pistillum is a receptacle proper five-cornered: germ globular: style cylindric, length of the corolla: stigma headed, depressed: the pericarpium is a superior woody capsule, roundish, five-celled, five-valved; valves deciduous.

The species cultivated is *C. odorata*, Barba-does Bastard Cedar.

In its native situation it rises with a straight stem to the height of seventy feet or more, but is small in this climate. While young the bark is smooth, and of an ash-colour; but, as it advances, becomes rough and of a darker colour: toward the top it shoots out many side branches, garnished with winged leaves, composed of sixteen or eighteen pair of leaflets, sometimes near three feet long, and of a pale colour, emitting a rank odour in the summer season: the fruit is oval, about the size of a partridge's egg, smooth, and of a very dark colour. It is a native of the West Indies.

Culture.—In this plant it is effected by sowing the seeds, obtained from abroad, in the autumn or spring months, in small pots filled with a light earth, plunging them in a hotbed. When the plants are of sufficient growth they should be removed with care into other small pots separately, and placed in the bark-bed, being afterwards managed as others of the woody stove kind.

CELASTRUS, a genus comprehending plants of the evergreen and deciduous shrubby kinds, for the greenhouse.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumoseæ*.

The characters are: that the calyx is a one-leaved perianthium, half-five-cleft, flat, small; divisions obtuse, unequal: the corolla consists of five ovate petals, spreading, sessile, equal, reflected at the borders: the stamina consist of five subulate filaments, the length of the corolla: the anthers are very small: the pistillum is a very small germ, immersed in a large flat receptacle, which is marked with ten streaks: style subulate, shorter than the stamens: stigma obtuse, trifid: the pericarpium is a coloured cap-

sule, ovate, obtusely triangular, gibbous, trilobular, trivalvular: the seeds are few, ovate, coloured, smooth, half involved in an unequal coloured arillus with a four-cleft mouth.

The species most generally cultivated are: 1. *C. bullatus*, Studded or Evergreen Virginia Staff-Tree; 2. *C. scandens*, Climbing Staff-Tree, or Bastard Euonymus; 3. *C. pyracanthus*, Pyracantha-leaved Staff-Tree, or Æthiopian Box-Thorn; 4. *C. buxifolius*, Box-leaved Staff-Tree.

There are other species that deserve cultivation.

The first in its native situation rises to the height of eight or ten feet, but in this climate few of these shrubs are much more than half that height. It generally puts out two or three stems from the root, which divide upward into several branches covered with a brown bark: the leaves are near three inches long and two broad, placed alternately on the branches: the flowers come out in loose spikes at the end of the branches, and are white: the capsule is of a scarlet colour, set full of small protuberances. It flowers in July, but seldom produces good seeds here. It is a native of Virginia.

The second species sends out several woody stalks, which are flexible, and twist themselves round trees and shrubs, or round each other, to the height of twelve and fourteen feet or more, girdling trees so closely as in a few years to destroy them. The leaves are about three inches long, and near two broad, serrate, alternate, of a lively green above, but paler on their under side, having several transverse nerves: the flowers are produced in small bunches towards the ends of the branches; are of an herbaceous colour, and succeeded by roundish three-cornered capsules, which are red when ripe, spreading open, and disclosing their seeds in the same manner as the spindle-tree. It flowers in the beginning of June, and ripens seeds in autumn. It is a native of North America.

The third rises with an irregular stalk three or four feet high, sending out several side branches covered with brown bark: the leaves are about two inches long, and more than half an inch broad, some pointed and others obtuse; they are stiff, of a lucid green, coming out irregularly from the branches, and continuing green through the year: the flowers are produced from the sides of the branches in loose tufts, many from one point, on long peduncles, and of an herbaceous white colour: the fruit is of a fine red colour, opening into three cells, containing an oblong hard seed. It is a native of the Cape, flowering the greatest part of the summer.

The fourth rises with a slender woody stalk to the height of ten or twelve feet, covered with

a light ash-coloured bark, and full of joints, armed with long spines, upon which grow many small leaves: the branches are slender, armed also with spines at every joint; but the whole plant is so weak as to require support: the leaves come out in clusters without order, are shaped somewhat like those of the narrow-leaved box-tree, but longer and of a lopse texture; are obovate and acutely serrate: both the branches and branchlets are angular: the flowers are on peduncled cymes from the axils, and the fruit globular. It is a native of the Cape, flowering in May and June.

Culture.—The two first species are capable of being raised either by seeds or layers, but the latter is the more ready method.

In the first mode, the seeds should be sown upon light fresh earth, either in beds or pots, as soon as they are procured from abroad, keeping them perfectly free from weeds till the plants are of sufficient growth to be planted out in nursery-beds, watering them occasionally when the weather is dry. They are mostly fit for this in the course of about two years.

In the latter method, layers from the young shoots should be laid down in the autumn, slitting them at a joint on the under sides. They are mostly sufficiently rooted to be taken off and planted out in the nursery in rows by the succeeding autumn.

The latter species should have a rather moist loamy soil.

The two last sorts are likewise capable of being increased in the same methods; but they should be in pots, in order to their being placed under the protection of frames or other contrivances when the weather is severe. After they have had a twelvemonth's growth they may be removed into other pots separately.

Cuttings made from the young shoots in all the sorts may likewise be stricken in the early spring months in pots exposed to a hotbed heat. These may be planted out in the following autumn, either in pots separately, or where they are to remain, according to their kinds.

These sorts should not be treated too tenderly, as they are apt to be rendered weak in their branches and less verdant.

The two first species are of a hardy nature, being well adapted to the borders and clumps of pleasure-grounds in mixture with other shrubs of the more tall growths. The first should, however, have a warm aspect and rather dry soil. The latter also succeeds in wilderness quarters under the shade of tall trees, where it winds itself about them to a great height, producing a fine effect in the autumn by its fruit.

The last two sorts are more tender, requiring,

as just observed, to be kept in pots to have the protection of the greenhouse in winter, where they afford variety in assemblage with others of the more hardy kinds.

CELERY. See **APIUM.**

CELOSIA, a genus containing plants of the flowery ornamental annual kind. The Amaranth, or Cock's Comb.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that the calyx is a three-leaved perianthium: leaflets lanceolate, dry, acute, and permanent, similar to the corolla: the corolla has five petals, lanceolate, acuminate, erect, permanent, stiffish, calyciform: the nectary a margin surrounding the germ, very small, five-cleft: the stamina consist of five subulate filaments, conjoined at the base to the plaited nectary, the length of the corolla: the anthers versatile: the pistillum is a globular germ: the style subulate, straight, the length of the stamens: the stigma simple: the pericarpium is a globular capsule, surrounded by the corolla, one-celled, circumcised: the seeds few, roundish, and emarginate.

The species commonly cultivated are: 1. *C. cristata*, Crested Amaranth, or Cock's Comb; 2. *C. margaritacea*, Pearly Spiked Celosia, or Cock's Comb; 3. *C. coccinea*, Scarlet Celosia, or Chinese Cock's Comb; 4. *C. lanata*, Woolly Celosia.

The first has an upright, stiff, single stem, from one to five feet in height: the leaves are large, oval, spear-shaped, on angular foot-stalks: the principal stem is crowned with a large crested head composed of numerous small florets placed closely together, resembling the comb of a cock. It is a native of Asia.

There are many varieties, differing in form, magnitude, and colour, from the same seed. In the Dwarf kinds, with large purple heads of flowers, with red heads, with scarlet heads, and with yellowish heads: in the Giant kinds, with very large purple heads, with red heads, with scarlet heads, with yellowish heads, with white heads, and with variegated heads: in the Branching kinds, with purple, with red, and with buff-coloured flowers.

The editor of Miller's Dictionary has raised great varieties from seeds from China and other countries, but generally found them alter in a few years, notwithstanding great care was taken in saving the seeds. The principal colours of their heads were red, purple, yellow, and white; but he has had some whose heads have been variegated with two or three colours. He also raised some from seeds from Persia, whose heads were divided like a plume of feathers, and were

of a beautiful scarlet colour, but which degenerated in a few years.

According to Linnæus, it varies with narrow and broad leaves; and Thunberg asserts that the crests or heads of flowers are often a foot in length and breadth in Japan, and extremely beautiful, but that they degenerate in other climates.

The second species, according to Miller, rises with an upright stalk about two feet high, garnished with oval leaves ending in points, of a pale colour; those on the lower part being four or five inches long, and one and a half broad in the middle, but diminishing gradually in their size upward: towards the upper part of the stalk a few side branches are sent out, which stand erect, each terminated by a slender spike of flowers, and the principal stalk by one which is much larger, being two or three inches long, and about as thick as a man's middle finger, the whole spike having a silvery colour. It is a native of America.

It varies, with oblong spikes of equal thickness, with pyramidal spikes, with entire white spikes, and with white and red spikes.

The third has a furrowed stalk, rising three or four feet high, and terminated by several spikes of flowers variously formed, some being crested, others plumed like feathers, of a bright scarlet colour. It is a native of China.

It varies, with crested spikes, with incurved crested spikes, and with plumed spikes.

The fourth species rises with a white woolly stalk from two to three feet high. From the upper part come out two or three slender side branches, which, as also the principal stalk, are terminated by woolly spikes of flowers: the leaves are white, lanceolate, obtuse, and downy. It is a native of Ceylon.

Culture.—In order to produce fine flowers of this sort, it is necessary to be particularly careful in collecting the seed, so as to have it good and well ripened.

The method of raising all the different sorts is by sowing the seeds of each separately in the early spring, as in the beginning of March, either upon a hotbed, or in pots to be plunged in one; in the first case, the surface being covered with fine, light, dry mould, four or five inches in thickness. When the plants have attained a few inches in growth they should be carefully taken up, and pricked out upon another hotbed prepared and moulded for the purpose, at the distance of six inches. They should remain in this situation till they begin to be crowded, which is mostly the case in six or seven weeks. At this period another hotbed should be in readiness, with very deep frames. When the plants have been raised without pots on the beds, as

many as are necessary should now be put in pots, care being taken to remove them from the former bed, with good balls of earth about their roots, by means of a trowel, placing one in each pot without disturbing the mould about them, filling up the spaces about them with good rich earth. Some water should then be given, and the pots be plunged to their rims in the bed, and as close together as possible, the openings between the pots being filled up well with mould to prevent the rising of steam.

The glasses in all these cases should be so managed as to preserve the heat in such a manner as may keep the plants in a constant vigorous state of growth, being matted up in the nights, and having linings applied when there may be occasion. When the weather is fine and calm, air should, however, be admitted rather freely by tilting up the ends of them, and water moderately sprinkled over them as there may be occasion.

For the Large sorts, the frames should have sufficient depth to draw them up to three or four feet in height, being raised, when necessary, as the plants advance in growth; but for the Dwarf kinds the common frames are sufficient, as their heads should be constantly kept near to the glasses. See *HOTBEDS* and *GARDEN-FRAMES*.

As the summer advances the plants should be gradually hardened by more free admissions of air till the glasses are wholly removed, and the plants set out where they are to remain, in which it is proper to support the tall sorts by handsome sticks. In this situation water should be freely given every day, to prevent the leaves from shrinking and keep the flower-heads full.

Plants of these sorts may be removed from the second hotbeds into the beds, clumps, or borders; but they never grow so strong as in the above method.

The seeds in all the different species become in a state of perfection about the beginning of the autumn, when attention should be had to select it from the best and finest plants of each kind, sheltering the heads when necessary from rains, &c. and keeping the different sorts of seed separate.

The perfection of the Cock's Comb chiefly consists in its having a regular, upright, straight stem without any side branches, but well furnished all the way with leaves, and the large flower-head erect, close, and regular.

These are all plants of the curious ornamental kind, which have a fine effect in the more conspicuous parts of gardens or pleasure-grounds in mixture with others of the flowery kind. The Cock's Combs are well calculated to be placed in the courts and other places about the house,

from the variety of effect which is afforded by their fine showy heads.

CELSIA, a genus comprising a plant of the perennial evergreen shrubby flowering exotic kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Lauridæ*.

The characters are: that the calyx is a five-parted perianthium: divisions lanceolate, obtuse, the length of the corolla, and permanent: the corolla is monopetalous, rotated; tube extremely short; border flat, half-five-cleft, unequal; divisions roundish, of which the two superior ones are smaller, the inferior one larger: the stamens consist of four capillary filaments, inclined towards the smallest divisions of the corolla; of which the two longer ones are shorter than the corolla, and are outwardly woolly: the anthers roundish, small: the pistillum is a roundish germ: style filiform, length of the stamens: stigma obtuse: the pericarpium is a roundish capsule, compressed at the tip, acuminate, sitting on the calyx, bilocular: the seeds are very many, small, and angular: the receptacles solitary and hemispherical.

The species mostly cultivated is *C. linearis*, Linear-leaved Celsia.

It is an elegant, evergreen, smooth shrub: the trunk is woody, but weak, the thickness of a quill, striated, pale-brown, three feet high, putting out numerous spreading branches its whole length; the younger ones green, grooved, and very leafy: the leaves growing three together, lanceolate-linear, acute, thinly serrate, or sometimes quite entire, shining on both sides, subpetioled, spreading much, the largest two inches long: peduncles axillary, solitary, one-flowered, shorter than the leaves, and three together: the corolla brilliant scarlet, with a blood-red throat. It is a native of Peru.

Culture.—It may be raised either from seeds or cuttings. In the first mode the seeds should be sown in the spring months in pots of light earth plunged in an ordinary hotbed. When the plants are sufficiently large they should be planted out singly in other pots.

In the latter mode the cuttings made from the young shoots should be planted in pots of rich earth in the spring season, and plunged in the bark hotbed, due shade and water being given till they have stricken fresh root. It blossoms best in a stove of moderate heat, but is capable of succeeding in a good greenhouse, where it affords variety in its leaves.

CELTIS, a genus containing plants of the hardy deciduous tree and shrub kinds. The Lote, or Nettle-tree.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Scabridæ*.

The characters of which are: that the hermaphrodite flowers are solitary superior: the calyx is a one-leaved perianth, five-parted; divisions ovate, patulous, and withering: there is no corolla: the stamens consist of five very short filaments, concealed at first by the anthers, but after the shedding of the pollen growing longer: anthers oblong, thickish, quadrangular, four-furrowed: the pistillum is an ovate germ, acuminate, length of the calyx: styles two, spreading, variously inflected, subulate, pubescent on every side, very long: the stigmas are simple: the pericarpium is a globular drupe, one-celled: the seed a roundish nut. Male flowers on the same plant inferior: the calyx is a six-parted perianthium, the rest as in the hermaphrodites: no corolla: the stamens six, the rest as in the hermaphrodites.

The species generally cultivated are: 1. *C. australis*, European Black-fruited Nettle-tree; 2. *C. occidentalis*, American Purple-fruited Nettle-tree; 3. *C. orientalis*, Oriental Yellow-fruited Nettle-tree; 4. *C. micrantha*, Jamaica Nettle-tree.

The first in its native situation rises with an upright stem to the height of forty or fifty feet, with many slender branches, which have a smooth dark-coloured bark spotted with gray: the leaves are alternate, near four inches long, and about two broad in the middle: the flowers are axillary all along the branches, coming out in the spring at the same time with the leaves, and generally decay before these are arrived at half their size. The fruit is the size of a pea or small cherry, and black. The wood is extremely hard. It is native of the South of Europe.

The second sort rises with a straight stem, which in young trees is smooth and of a dark colour; but as they advance it becomes rougher and of a lighter green: the branches spread very much: the leaves are alternate, on pretty long foot-stalks, are a little pubescent; and when full grown broad-ovate, acuminate at the point, and quite entire, in the other parts serrate: the base flowers come out opposite to the leaves upon long peduncles. The fruit is smaller than that of the first sort, and when ripe of a dark purple colour. Though it comes out late in the spring it is equally late in fading, the leaves continuing in full verdure till within a few days of their dropping off. It is a native of North America, flowering in May, and ripening seeds in October.

The third species rises with a stem about ten or twelve feet high, dividing into many branches,

which spread horizontally on every side, and have a smooth greenish bark: the leaves are about an inch and half long, and near an inch broad, inclining to a heart shape, but oblique, one side of the base being smaller and lower than the other; they are of a thicker texture than those of the common sort, and of a paler green, alternate as they are, and on short foot-stalks: the fruit is oval and yellow, but when fully ripe turns to a darker colour. The wood is very white.

The fourth is a shrubby tree, which seldom rises above ten or twelve feet, and throws out a great number of loose branches. It is a native of Jamaica, flowering in August and September.

Culture.—All the sorts are capable of being increased by seeds.

These should be sown as soon as they can be procured (if in the autumn the better) either in pots, boxes, or in a warm rich border, covering them lightly in. When the plants appear they should be occasionally sheltered by mats in cold nights, and in dry hot weather, while very small, have shade in the middle of hot sunny days during summer, and frequent waterings should likewise be given; and in autumn and winter be protected from frost by occasional coverings. In the early spring months, when of one or two years' growth, they should be pricked out in rows in a sheltered situation, a foot asunder: they require no further trouble but occasional weeding. In two, three, or more years they are ready for planting out in the shrubbery or other plantations.

Their early growth may be greatly promoted by the aid of a hotbed.

The variegated varieties should be continued by laying down the young shoots in the autumn, being taken off and planted out when well rooted.

These trees are sufficiently hardy to prosper here in the open ground, in any exposure or soil.

They are well adapted for plantations, on the boundaries of extensive lawns, wilderness-walks, and the most conspicuous parts of parks, either placed in clumps or singly.

The two first sorts may also be employed as forest-trees, as they are of free growth, and their wood tough and pliable.

CENTAUREA, a genus containing plants of the herbaceous annual and perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositae*.

The characters are: that the calyx is common imbricate, roundish; scales often variously termi-

nated: the corolla is compound, flosculous, difform: corollules hermaphrodite, very many in the disk. Females fewer, larger, lax, in the ray: proper of the hermaphrodite monopetalous; tubefiliform; border ventricose, oblong, erect, terminated by five divisions, which are linear erect: of the females monopetalous, funnel-form; tube slender, gradually enlarged, recurved; border oblong, oblique, unequally divided: the stamina in the hermaphrodites have five capillary filaments, very short: anthers cylindric, tubular, length of the corollule: the pistillum in the hermaphrodites is a small germ: style filiform, length of the stamens: stigma very obtuse, projecting in a point, which in many is bifid: in the females, a very small germ: style scarce any: there is no stigma or pericarpium: calyx unchanged, converging: the seeds in the hermaphrodites solitary: down or egret in most plumose or pilose: in the females none: the receptacle is bristly.

The species are very numerous, but those most commonly cultivated are: 1. *C. Centaureum*, Great Purple Centaury; 2. *C. montana*, Perennial Blue-Bottle, or Blue Bachelor's Button; 3. *C. Cyanus*, Annual Blue-Bottle, or Bottles of all Sorts; 4. *C. moschata*, Purple Sweet Centaury, or Sweet Sultan.

The first has a strong perennial root, and a great number of long pinnate leaves, of a lucid green, spreading wide on every side, proceeding from it: the peduncles are slender, but very stiff, and divide at top into many smaller peduncles. These, together with the stalks, rise five or six feet high, having at each joint one small pinnate leaf of the same form with the others: each of the peduncles is terminated by a single head of purple flowers, considerably longer than the calyx. They come out in July, and in very warm seasons produce ripe seeds in this climate. It is a native of the mountains of Italy, &c.

The second species has a perennial root, running deep into the ground: the stem is commonly single, upright, one-flowered; sometimes, especially in a cultivated state, it puts forth a branch or two: the leaves are quite entire, tomentose: the flower large and specious. It is a native of the South of Europe.

There are varieties, with broad leaves, with narrow leaves, and Dwarf Perennial Blue-Bottle.

In the third species the stem is from one to two feet high, angular, slightly tomentose, branched at top: the leaves are numerous, white underneath, with three parallel ribs: the branches are one-flowered. It flowers from June to August. The wild flower is usually blue, but sometimes white or purple.

It varies with blue flowers, with blue and

white flowers, with purple flowers, with purple and white flowers, with flesh-coloured flowers, with flesh-coloured and white flowers, with violet-coloured flowers, with violet and white flowers, with red flowers, with double blue flowers, with double purple flowers, and with double purple and white flowers.

The fourth species is annual, and sends up a round channelled stalk near three feet high, which divides into many branches, with jagged leaves, of a pale green, smooth, and close to the branches; from the side of the branches come out long naked peduncles, each sustaining a single head of flowers, which have a very strong odour, so as to be offensive to many people, but to others very grateful: they are purple, white, or flesh-coloured. It is a native of Persia.

It varies with purple flowers, with white flowers, with flesh-coloured flowers, with purple fistulous flowers, with white fistulous flowers, with fringed flowers with sawed leaves, and with bright yellow fistular flowers.

Culture.—These plants are raised with little trouble or difficulty. The first sort is capable of being increased by parting the roots, and planting them out in the early spring months or in the autumn, in beds or borders where they are to remain.

And this, as well as the annual sorts, may likewise be raised from seed, which in it and the second species should be sown in the borders or clumps in March or the following month, the young plants being kept clean from weeds, and removed into other situations, when necessary, in the following autumn.

The third and fourth species and varieties are also propagated by sowing the seeds in the open ground where the plants are to flower, in the above season. They should be put in, in patches of six or seven seeds in a place, covering them lightly in, to the depth of about half an inch. The latter sort may also be sown in the autumn as soon as the seeds are fully ripened, by which means they will flower at a much more early period in the following year.

The Sweet Sultan kinds, and especially the Yellow, which is rather tender, may also be rendered more forward by sowing the seeds under frames or glasses on gentle hotbeds in the early spring, removing the plants to the open ground when of sufficient growth, with balls of earth about their roots, or into pots.

All the sorts are proper for ornamenting the clumps and borders of pleasure-grounds; the two first being placed more backward in them, as growing large.

CEPA. See ALLIUM.

CEPHALANTIUS, a genus comprehend-

ing a plant of the hardy exotic deciduous flowering shrubby kind. The Button-Tree.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatae*.

The characters are: that the calyx has no common perianthium, but the receptacle collecting many floscules into a globose head: perianthium proper one-leafed, funnel-form, angular; border quadrifid: the corolla is universal equal: proper monopetalous, funnel-form, acute, quadrifid: the stamina consist of four filaments, inserted into the corolla, shorter than the border: anthers globose: the pistillum is an inferior germ: style longer than the corolla: stigma globose: there is no pericarpium: the seeds solitary, long, attenuated at the base, pyramidal and lanuginous: the receptacle common globular and villous.

The species commonly cultivated is *C. Occidentalis*, American Button-wood.

It is a shrub that seldom rises higher than six or seven feet in this climate. The branches come out by pairs, opposite at each joint: the leaves are either in pairs opposite, or there are three at the same joint, standing round the branch; these are near three inches long, and one and a quarter broad, having a strong vein running longitudinally through the middle, and some small transverse veins from that to the borders; they are of a light-green, and their foot-stalks change to a reddish colour next the branches; the ends of the branches are terminated by loose spikes of spherical heads, about the size of a marble, each of which is composed of many small flowers, of a whitish yellow colour, fastened to an axis in the middle; appearing in July, and, in warm seasons, succeeded by seeds, which have sometimes ripened here.

Culture.—This shrub is capable of being raised either by seeds procured from its native situation, or by layers and cuttings. In the first mode the seeds should be sown in beds in the open ground as soon as they are procured, which if in the autumn, the plants mostly appear in the spring; but when it is done late in the spring they will sometimes not rise till the spring following. The earth should be kept free from weeds, giving shade to the plants in very hot weather, and a little protection from severe frost. The first summer the plants should be frequently watered in dry weather; and when they are of one or two years' growth, according to their strength, transplanted in the autumn or spring months in the nursery lines, where they should remain till fit for the shrubbery.

The layers of the young shoots should be put down in the autumn, and in the following autumn be taken off and planted where they are to stand.

Cuttings may likewise be made in the autumn or spring, and planted out in a rather moist shady situation, care being taken to keep them free from weeds. When they have become well rooted, they may be removed into the places where they are to remain.

This shrub affords an agreeable variety when in assemblage with others, either in the open ground or other collections.

CERASTIUM, a genus containing plants of the low herbaceous kind. Mouse-ear Chickweed.

It belongs to the class and order *Dicandria Pentagynia*, and ranks in the natural order of *Caryophylli*.

The characters are; that the calyx is a five-leaved perianthium; leaflets ovate-lanceolate, acute, spreading and permanent: the corolla has five petals, bifid, obtuse, erect-expanding, length of the calyx: the stamina consist of ten filaments, filiform, shorter than the corolla; the alternate ones shorter: anthers roundish; the pistillum is an ovate germ: styles five, capillary, erect, length of the stamens: stigmas obtuse: the pericarpium is an ovate-cylindric or globular capsule, obtuse, unilocular, gaping with a five-toothed tip: the seeds are very many and roundish.

The species cultivated are; 1. *C. perfoliatum*, Perfoliate Mouse-ear; 2. *C. repens*, Creeping Mouse-ear or Sea Pink.

There are other species that may be cultivated.

The first is an annual plant, which rises with an upright stalk a foot high; the lower leaves have much resemblance to those of Lobel's Catchfly: the stem-leaves are of the same shape, but smaller, placed by pairs, and embracing the stalks: the flowers come out at the top of the stalks, and also from the wings of the leaves on the upper part of the stalks; they are white, and shaped like those of chickweed; appearing in May and June, and succeeded by beaked capsules, containing many seeds of a roundish form. It is a native of Greece.

The second species sends out many weak stalks which trail upon the ground, and put out roots at their joints: the leaves are about two inches long, and little more than half an inch broad, very hoary; those next the root are much smaller than the upper ones: the flowers come out from the side of the stalks upon slender peduncles, which branch out into several smaller, each supporting a white flower. It was formerly cultivated in gardens, under the title of Sea Pink, as an edging. It is a native of France, &c.

Culture.—The propagation in these plants is

readily effected either by seeds, slips from the rooting branches, or parting the roots, each of which may be performed either in the autumn or spring season, placing them in proper situations in the open ground. The trailing branches root as they extend themselves, at each joint, by which they easily multiply.

Being of spreading growth, they are highly useful for covering naked banks, and running over artificial rock-works, ruins, grottos, and other similar parts of pleasure-grounds.

CERASUS, the Cherry-tree. See *Prunus*.

CERATONIA, a genus containing a plant of the evergreen exotic shrubby kind. The Carob-tree, or St. John's Bread.

It belongs to the class and order *Polygamia Trioecia* and ranks in the natural order of *Leguminosæ*.

The characters are: that in the male the calyx is a five-parted perianthium, very large: there is no corolla: the stamina consist of five subulate filaments, very long, spreading: the anthers large, twin: in the female the calyx is a one-leaved perianthium, divided by five tubercles: there is no corolla: the pistillum is a germ lying concealed within a fleshy receptacle: style long, filiform: stigma headed: the pericarpium is a legume, very large, obtuse, compressed, coriaceous, with a great many transverse partitions, the interstices filled with pulp: the seed solitary, roundish, compressed, hard, glossy: hermaphrodite flowers on a distinct tree.

The species cultivated is *C. siliqua*, the Carob-tree.

It rises with an upright thick woody stem to the height of fifteen or twenty feet in its native situation: the head divided into many branches: the leaves are pinnate, leaflets roundish entire, thick, rigid, of a darkish green colour, three inches in breadth, and rather more in length: the flowers are small, of a dark purple: these are succeeded by large fleshy compressed seed-pods, containing many seeds in a soft pulp. It is a native of Syria, &c.

Culture.—It is propagated by sowing the seeds procured from its native situation, in pots of light earth in the spring, plunging them in a moderate hot-bed, and, after the plants have attained sufficient growth, removing them into separate pots, shade, water, and fresh air being occasionally given, and the pots continued in the hot-bed. When the weather becomes fine in the summer, they should be gradually hardened by exposure to the free air, and placed out till the approach of autumn, when the protection of the greenhouse will be necessary.

They are afterwards to be managed as other greenhouse plants.

CERCIS, a genus containing hardy deciduous trees of the flowering kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leaved perianthium, very short, bell-shaped, gibbous below, melliferous; mouth five-toothed, erect and obtuse: the corolla is pentapetalous, inserted into the calyx, resembling a papilionaceous corolla: wings: petals two, bent upwards, affixed by long claws: standard: petal one, roundish, clawed beneath the wings, and shorter than the wings: keel: petals two, converging into a cordate figure, including the organs of generation, affixed by claws: the nectary is a style-shaped gland, below the germ: the stamina consist of ten, distinct, subulate filaments, bent downwards, of which four are longer than the rest, and covered: the anthers oblong, incumbent, rising upwards: the pistillum is a linear-lanceolate, pedicelled germ: style of the length and situation of the stamens: stigma obtuse, ascending: the pericarpium is an oblong legume, obliquely acuminate, unilocular: the seeds some, roundish, connected to the superior suture.

The species are: 1. *C. siliquastrum*, Common Judas-tree; 2. *C. Canadensis*, Canada Judas-tree, or Red Bud-tree.

The first rises with an upright trunk to the height of twenty feet, covered with a dark brown bark, dividing upwards into many irregular branches, with leaves placed irregularly on the branches, on long foot-stalks; they are of a pale green on their upper, and of a grayish colour on their under side, and fall off in autumn. The flowers come out in the spring with the leaves on every side the branches, and many times from the stem of the tree in large clusters, arising from the same point, on short peduncles, and are of a very bright purple colour, being in full beauty before the leaves have attained half their size. When the flowers fall off, the germ becomes a long flat pod, containing a row of roundish seeds, a little compressed.

The wood is very beautifully veined with black and green, taking a fine polish. It is a native of the Levant, &c.

There are varieties with white flowers; with flesh-coloured flowers, but without the beauty of the first; also with broader pods.

The second sort grows to a middling stature in the places where it is a native, but in this climate rarely rises with a stem more than

twelve feet high, but branches out near the root. The branches of this are weaker than those of the first sort; the leaves are downy, and terminate in points; whereas those of the first are smooth, and round at the end, where they are indented. The flowers are also smaller; but the trees are equally hardy, thriving in the open air. It is a native of North America, where it is known by the title of Red Bud, from the appearance of the flower-buds in spring before the leaves come out.

The wood is of the same colour and texture as the first.

Culture.—This is effected by sowing the seeds in the spring season, as about March, in beds of common ground, to the depth of half an inch. As soon as the plants appear, they should be kept clean, and occasionally watered, and when of sufficient growth be removed into the nursery, planting them in rows at the distance of one foot, and two feet between the rows. Having remained in this situation for two or three years, they become proper for planting out in the shrubbery.

They may be raised by layers and cuttings; but they seldom succeed so well in this way.

These are highly ornamental when planted out in the clumps, borders, and other quarters, among hardy, flowering, deciduous trees of other kinds.

CEREUS. See **CACTUS**.

CERINTHE, a genus which furnishes plants of the hardy, ornamental, flowering, annual kind. The Honeywort.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifolice*.

The characters are: that the calyx is a five-parted perianthium; divisions oblong, equal, permanent; the corolla is monopetalous and bell-form: tube short, thick: border tube-bellied, rather thicker than the tube: mouth five-cleft; throat naked, pervious: the stamina consist of five, subulate filaments; very short: anthers acute, erect: the pistillum is a four-parted germ: style filiform, length of the stamens: stigma obtuse: there is no pericarpium: calyx unchanged: the seeds two, bony, glossy, subovate, outwardly gibbous, and bilocular.

The species cultivated is *C. major*, Great Honeywort.

It rises with stems eighteen inches high and more, round, smooth, branching, and leafy: the leaves are glaucous, becoming blue by age, smooth, without prickles, but ciliated about the edge, and dotted with white: the branches are leafy and nodding; with flowers among the leaves, hanging on long peduncles: the tube of

the corolla is yellow, but the border purple. It is a native of Italy, flowering in June and the two following months.

There are varieties with smooth leaves and purple flowers, and with prickly leaves and yellow flowers.

Culture.—The plants are raised by sowing the seeds annually in the autumn or early spring months in patches in the borders, clumps, or other parts. The autumn sowings should be made as early as possible. They also rise from the self-sown seeds. They should be managed as other hardy annuals. These are plants proper for being planted out about the apiary, or in the small beds or borders.

CESTRUM, a genus affording plants of the shrubby exotic flowering kind. Bastard Jasmine.

It belongs to the class and order *Petandria Monogynia*, and ranks in the natural order of *Luridee*.

The characters are: that the calyx is a one-leaved perianthium, tubular, columnar, obtuse, very short: mouth five-cleft, erect, obscure: the corolla monopetalous, funnel-form: tube cylindric, very long, slender; throat roundish; border flat, plaited, five-cleft; divisions ovate, equal: the stamina consist of five filiform filaments, attached longitudinally to the tube, emitting a toothlet inwards at the middle: anthers roundish, quadrangular, within the throat: the pistillum is a cylindric-ovate germ, length of the calyx: style filiform, length of the stamens: stigma thickish, obtuse, scarcely emarginate: the pericarpium is an ovate berry, unilocular, oblong: the seeds very many, roundish.

The species are; 1. *C. nocturnum*, Night-smelling Cestrum; 2. *C. diurnum*, Day-smelling Cestrum.

There are other more tender species that may be cultivated.

The first rises with an upright stalk about six or seven feet high, covered with a grayish bark, and divides upward into many slender branches, which generally incline to one side, and are garnished with leaves placed alternate, near four inches long, and one and a half broad, smooth on their upper side, of a pale green, and on their under side they have several transverse veins, and are of a sea-green colour, having short foot-stalks: the flowers are produced at the wings of the leaves, in small clusters, standing upon short peduncles, each sustaining four or five flowers, of an herbaceous colour. They appear in August, but are not succeeded by berries in this climate. It is a native of the island of Cuba.

The second species rises with an upright stalk to the height of ten or twelve feet, covered with

a smooth light-green bark, dividing at top into many smaller branches, with smooth leaves near three inches long, and one and a half broad, of a lively green colour, and the consistence of those of the Spurge Laurel; these are ranged alternately on the branches. Towards the upper part of the shoots come out the flowers from the wings of the leaves, standing in clusters close to the branches; they are very white, shaped like those of the first sort, and smell sweet in the day-time, whence it had the appellation of *Lady-of-the-Day*. The berries of this are smaller than those of the first sort. It flowers in September, October, and November, and is a native of the Havannah.

Culture.—These plants are capable of being increased either by seeds or cuttings; but, as the former cannot be easily procured, the latter is the more common method.

The seeds should be sown in pots filled with light friable fresh earth in the early spring, and plunged into a gentle hotbed. When the plants are sufficiently strong they should be removed into separate pots, shade and a little water being given occasionally till they are well rooted again.

The cuttings should be made from the side shoots to the length of five or six inches, and planted in pots of fresh earth in the summer season, plunging them in a bark hotbed, a little water and shade being given till they have stricken root.

In both methods the plants require to be kept in pots filled with light earth in the stove.

From the evergreen flowery nature and fragrance of these plants, they afford pleasure and variety in assemblage with other stove exotics.

CHAMÆROPS, a genus comprising a plant of the perennial exotic kind. The Palmetto, or Dwarf Palm.

It belongs to the class and order *Polygamia Dioecia*.

The characters in the hermaphrodite flower are: that the calyx is an universal spathe, compressed, bifid: spadix branching: perianthium proper tripartite, very small: the corolla tripartite: petals ovate, coriaceous, erect, acute, inflexed at the tip: the stamina consist of six subulate compressed filaments, scarce cohering at the base: anthers linear, twin, growing to the interior side of the filaments: the pistillum has three roundish germs: styles as many, distinct, permanent: stigmas acute: the pericarpium three drupes, globose, unilocular: the seeds solitary and globose.

The male flower in a distinct plant, flowering in the same manner. The calyx and corolla as in the hermaphrodite: the stamina a gibbous receptacle, ending in six filaments not marked

by perforations. All the other particulars as in the hermaphrodites.

The species cultivated is *C. humilis*. Dwarf Fan Palm.

It never rises with an upright stem, but the foot-stalks of the leaves proceed immediately from the head of the root, and are armed on each side with strong spines; are flat on their upper surface, and convex on their under side: the centres of the leaves are fastened to the foot-stalk, and spread open like a fan, having many foldings, and at the top are deeply divided like the fingers of a hand: when they first come out they are closed together like a fan when shut, and are fastened together by strong fibres which run along the borders of the leaves; and when the leaves spread open these fibres or strings hang from the sides and ends: the orders of the leaves are finely sawed, and have white narrow edgings: they are from nine to eighteen inches long, and near a foot broad in their widest part. As the lower leaves of the plants decay their vestiges remain, and form a short stump above ground, in the same manner as our Common Male Fern: from between the leaves comes out the spadix or club, which sustains the flowers; this is covered with a thin spathe or hood, which falls off when the bunches open and divide. It grows naturally in Italy, &c.

Culture.—It is capable of being propagated by seeds and side-slips from the head of the root. In the first method, the seeds procured from abroad, should be sown in pots of light sandy earth, and plunged in a hotbed of tanners' bark, occasional waterings being given. In the autumn or spring following the plants will be in a proper state to be pricked out in separate pots. Much depends on having good seeds.

In the second method the slips of the crown of the roots or side off-sets should be separated with the root fibres, and planted out in pots filled with sandy earth, and plunged in a hotbed. The plants are stronger from seeds than when raised in this way.

In ten or twelve months the plants will be fit to be removed into other pots, which should be done in such a manner as not to injure their roots, as when that is the case they are liable to be destroyed.

They mostly require the protection of a stove while young; but when become hardy by gradual exposure to the air, they will succeed in a full exposure in summer, and in a greenhouse in winter; but must always be kept in pots of light sandy earth, and be frequently watered in summer, but more moderately when the weather is cold.

They afford variety in the stove collections.

CHAMEMOILE. See ANTHEMIS.

CHAMPIGNON. See AGARICUS.

CHANGEABLE ROSE. See HIBISCUS.

CHASTE TREE. See VITEX.

CHEIRANTHUS, a genus comprising plants of the herbaceous, annual, biennial, and perennial flowery kinds. Wall-flower and Stock Gilliflower.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliqueae*.

The characters are: that the calyx is a four-leaved compressed perianthium: leaflets lanceolate, concave, erect, parallel converging, deciduous; the two outer gibbous at the base: the corolla is four-petalled, cruciform: petals roundish, longer than the calyx: claws the length of the calyx: the stamina consist of six subulate filaments, parallel, the length of the calyx: two of them within the gibbous leaflets of the calyx, a little shorter than the other four: anthers erect, bifid at the base, acute at the tip, and reflected: a nectareous gland surrounds the base of the shorter stamens on each side: the pistillum is a prismatic germ, four-cornered, the length of the stamens, marked with a tubercle on each side: style very short, compressed: stigma oblong, two-parted, reflected, thickish, permanent: the pericarpium is a long compressed silique; the two opposite angles obliterated, marked with a toothlet, two-celled, two-valved, furnished with the very short style and the erect bifid stigma: the seeds are very many, pendulous, alternate, subovate, compressed, with a membranous edge.

There is a great number of species; but those mostly cultivated for ornament are: 1. *C. cheiri*, Common Wall-flower; 2. *C. incanus*, Queen's Stock Gilliflower; 3. *C. fenestralis*, Cluster-leaved Dwarf Stock Gilliflower; 4. *C. annuus*, Annual Stock Gilliflower, or Ten-week Stock; 5. *C. maritimus*, Dwarf Annual Stock Gilliflower, or Virgin Stock.

The first rises with a woody stem from a foot to two feet or more in height, ascending: the branches are angular: the leaves crowded, upright, lanceolate, with few serratures, smooth, and concave: the petioles hardly distinct from the leaves: the peduncles four-cornered. In garden culture the branches are wide and the leaves broad, with large flowers. It is a native of Switzerland, &c. flowering from April till June.

The chief varieties are the common dwarf yellow with a low bushy head, the large yellow with a branchy stem forming a bushy head, the large yellow bloody with a branchy head, the true bloody with a branchy stem, the narrow-

leaved straw-coloured, the variegated leaved yellow, the winter, and the white, having a very branchy greenish stem, and bushy head: the flowers in each single or double.

The second species rises with a strong stalk, which is almost shrubby, from a foot to two or more in height, having oblong, spear-shaped, hoary leaves, which are frequently waved on their edges, and turn downward at the extremity; from the stalk come out many lateral branches, with the same shaped leaves, but smaller; these side branches are each terminated by a loose spike of flowers, each having a woolly calyx, and four large roundish petals, indented at the end. These usually appear in May and June, but the same plants frequently continue flowering most part of the summer. The seeds ripen in autumn, and the plants often perish soon after; but in dry rubbish they last two or three years, and become shrubby. Those with single flowers are not worth preserving after they have perfected their seeds. It is a native of Spain, &c.

The flowers in this sort vary in their colour; some are of a pale red, others of a bright red, and some curiously variegated, but those of the bright red are generally most esteemed.

There are likewise other varieties, as the Scarlet or Brompton Stock, with a strong, upright, single stem, from one to three feet high, crowned by a cluster of long thick leaves and erect spikes of large scarlet single and double flowers.

The White Brompton Stock, with stem as above, and long erect spikes of large elegant flowers.

The Purple or Twickenham Stock, with a thick stem a foot and a half or two feet high, very branchy upwards, and all terminated by erect spikes of purple single and double flowers, purple blood-spotted single and double flowers, variegated purple and white flowers.

The Wall-flower-leaved or Shrubby Stock, with a shrubby firm stem from a foot to a yard high, dividing into many short branches, forming a bushy head, all terminated by erect spikes of pure white single and double very fragrant flowers, whitish-flesh-coloured flowers, whitish-purple flowers, whitish-red spotted flowers.

The third has a shrubby stem, from six to eight inches high, nearly the thickness of the little finger, straight, rigid, round, covered with leaves, hoary with nap, dividing at top into two or three very short alternate branches: the leaves are scattered, petioled, lanceolate, bending this way and that: the flowers alternate, nearly the size of those in the Common Stock, and of a purple colour. It flowers from May to July.

The fourth species rises with a round smooth stalk about two feet high, dividing into several

branches at top: the leaves are lanceolate, hoary, rounded at the end, almost opposite, or alternate, or three and four together of unequal sizes: the flowers are produced in loose spikes at the ends of the branches, and placed alternately. It is a native of the southern parts of Europe.

There are varieties with red, purple, white and striped single flowers, and with double flowers of the same colours.

The fifth species has the stems six or eight inches in height, very much branched, divaricated, somewhat stiff, rugged, with twin appressed hairs: the leaves are oval-lanceolate, somewhat reflected at the tip, green, on rather long petioles, stiffish; the upper ones obscurely subdentated: the branches terminated by spikes of red flowers, turning purple. It is a native of the coast of the Mediterranean, and improperly termed Virginia Stock.

Culture in the Wall-flower kind.—These plants may be increased by seeds, slips, or layers; but, in order to have good flowers, great care should be taken to have the seeds collected from the best plants: such as is purchased from the seedsmen can seldom be fully depended upon. The seed in this sort is less liable to produce double flowers than in the succeeding kind.

The seed should be sown in the spring, as in April or the following month, either in the situations where the plants are to remain, or on beds of earth that have not been enriched by manure, being covered lightly in. When the plants appear, frequent waterings should be given in dry weather; and when they have attained sufficient growth, where the bed method is practised, they should be thinned out during a wet season in the latter end of summer or beginning of autumn, and replanted in the situations where they are to flower, or be pricked out in nursery beds, nine inches distant, to remain till the following spring, to be removed with balls of earth about their roots; but the first is the most advisable method, as they do not succeed so well by removing. The bed method is chiefly in use with the market-gardeners, who cultivate the flowers for sale.

The slip mode is chiefly practised in perpetuating the fine double flowers. The slips are made from the side shoots that have no flowers, which, after being divested of their lower leaves, are planted in the situations where they are to remain, or in beds, to the depth of three or four inches, any time from April to May, slight waterings and shade being given. In the autumn those in the beds should be removed into separate pots, to have the occasional protection of a frame in the winter.

The young, tender, and pliable branches may be laid down any time from May till the end of June, a little water being occasionally given when the weather is dry. These should be taken off when they are well rooted, and be planted out either where they are to remain or in pots.

These two last methods, however, seldom afford plants that have so good flowers as those raised from seed, being weaker and furnished with shorter spikes of flowers. They should therefore be chiefly confined to those varieties that cannot be raised with certainty from seed.

When these plants are intended for the purpose of ornamenting and affording variety on walls, ruins, or other places of this sort, the seed should constantly be sown upon them in the autumn or early spring, covering it in with a little earth to the depth of half an inch. They will afterwards propagate themselves by shedding their seed, and continue for a great length of time.

When cultivated in the vicinity of large towns, for the purpose of sale, it is the practice, especially with the market-gardeners around London, to prick the young plants out of the seed-beds into nursery-rows at the distance of ten or twelve inches, and nine or ten from plant to plant; and where they grow too luxuriantly in these situations they are again removed about August, in order to check their too full growth, and by that means render their heads more bushy. They are usually exposed for sale, with small balls of earth about their roots, when just beginning to put forth bloom, so as that their colours and the properties of their flowers can be discerned.

Where a blow of the double seedling sort is desired, they should be placed in pots, with balls of earth to their roots, as soon as their double-flower-buds appear, giving them a little water and proper shade till they become established again.

These plants succeed best and continue longest where the soil is of the poor and rather calcareous kind.

Culture in the Stock Gilliflower kind.—This may be performed exactly in the same manner as in the Wall-flower sort, only the seed should always, as much as possible, be sown where the plants are to remain, or the plants be pricked out into them while they are very young, as in their more advanced growth they never succeed well when removed, or are of so long duration, as their roots are sticky and but slightly provided with fibres. When the removal of the plants is practised at a late period, it should constantly be done with large balls of earth to their roots.

And in the slip and layer methods, as practised for the varieties, the plants seldom grow so freely or become so fine as those raised from seed. The soils on which they are found to succeed the best, are such as are fresh, and which have not been enriched by manure.

Both these species and their varieties, in order to have a good show of flowers, and the best and most perfect plants, should be raised annually in the different modes, as, in whatever way they are increased, they always afford the finest flowers the first season of their complete flowering.

And such of the double sorts of the different kinds as have been potted should be protected during the winter season, either in frames for the purpose or some other contrivance.

To have good flowers of this sort great care should be taken to remove all the small and imperfect flowers from the seed beds at the time of setting them out.

Culture in the Annual Stock kind.—In these plants it is accomplished by sowing the seeds at suitable times, so as to produce successions of flowers during the summer and autumn, from the beginning of February till the latter end of May, covering the seed in lightly. The first and second sowings should be made on a very gentle hotbed, or in pots placed in it, or in frames, to be protected in the night; but the others may in general be performed in the places where the plants are to flower, or in beds, to be afterwards pricked out or removed into pots or where they are to remain and blow. The former is, however, the best practice where it can be employed, as removing always injures the growth of the plants. In sowing and planting them out in the borders or other parts of pleasure-grounds, it is usual to put them in in patches of five or six in each patch, disposing them in a varied manner.

The plants of the early sowings will mostly be in a state to be planted out in pots or on the borders in the beginning of May, a little water being given when the weather is dry. They are always proper to be set out when they have attained three or four inches growth, and have several leaves.

When these plants are raised by themselves for show, it is the practice to plant them in rows in beds four feet wide, ten or twelve inches apart each way, care being taken to keep them clear from weeds, and duly watered in dry weather.

To have these plants to flower in the autumn and winter, some of them should be potted about the latter end of July, and placed in a warm situation, occasional waterings being given;

and in the beginning of autumn, removed under the protection of the greenhouse or garden-frames.

Much caution is necessary in the culture of these flowers, not only to choose good seed, but to remove all the bad and imperfect plants as soon as possible from the beds or other places where they are grown.

The fourth species may likewise be increased by sowing the seeds at different times, as in the above sort, chiefly in the places where they are to flower, and a few in pots for being set out with others of similar growth.

The fifth sort is propagated and managed in the same methods as the two first.

In order to provide good seed of the three first species, great attention should be paid to have it collected from those single plants which have the largest flowers with the deepest and brightest colours. Some suppose it advantageous to take it from such plants as have rather a tendency to the double kinds. The branches should be separated when dry, as the seeds become perfectly ripened, and be tied up in small bunches, and hung up in a dry airy situation till the seed is fit to be rubbed out and put up for use.

In the two last species nothing further is necessary but to take it, when perfectly ripened, from the best plants of the respective kinds.

All the species and varieties are highly ornamental, but particularly the double-flowering sorts, being introduced not only in the more open exposures of the clumps and borders of the pleasure-grounds and gardens, where variety is wanted, but in other places contiguous to the house for the delightful smell they afford.

The last species is sometimes made use of as an edging, and the third as an ornamental plant in windows.

CHELIDONIUM, a genus furnishing a plant of the hardy herbaceous flowery kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rhacadeæ*.

The characters are: that the calyx is a two-leaved roundish perianthium: leaflets subovate, concave, obtuse, caducous: the corolla has four roundish flat petals, spreading, large, narrower at the base: the stamina consist of very many filaments (thirty), flat, broader at top, shorter than the corolla: the anthers are oblong, compressed, obtuse, erect, and twin: the pistillum is a cylindric germ, the length of the stamens: there is no style: the stigma headed and bifid: the pericarpium is a cylindric silique, sub-bivalve: the seeds very many, ovate, increased, and shining: the receptacle linear, between the valves of a kind of circumambient suture, not gaping.

The species worthy of cultivation as an ornamental plant is *C. glaucum*, Sea Celandine, or Yellow-horned Poppy.

It has a strong stem: the root-leaves are pin-natifid, waved, variously lobed, and indented; pinnae gradually larger upwards; hairy on both sides: stem-leaves embracing, deeply indented, rough above, smooth beneath: the branches are dichotomous: the flowers are of a scarlet colour, and succeeded by long horn-shaped pods. The root, according to some, is annual, but others assert it to be perennial.

Culture.—These plants are raised from seed, which should be sown either in the autumn or spring where the plants are to remain; or they may be raised in a seed-bed, and be afterwards planted out where they are to flower. Some seed should be sown annually, as the plants seldom continue longer than two years. It is hardy, and succeeds in almost any soil or situation.

The plants afford ornament and variety in the borders both from their flowery nature and the peculiarity of their long-horned pods.

CHELONE, a genus comprehending plants of the flowery herbaceous perennial kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved, five-parted, very short, permanent perianthium: divisions erect and ovate: the corolla monopetalous and ringent: tube cylindric, very short: throat inflated, oblong, convex above, flat beneath: border closed, small: upper lip obtuse, emarginate; lower almost equal to the upper, very slightly trifid: the stamina consist of four filaments, hid beneath the back of the corolla; the two side ones a little longer: the anthers incumbent: the rudiment of a fifth filament, like the point of a dagger, between the upper pair of stamens: the pistillum is an ovate germ: style filiform, situation and length of the stamens: the stigma is obtuse: the pericarpium is an ovate capsule, two celled, longer than the calyx: the seeds very many, roundish, surrounded with a membranous rim.

The species cultivated for ornament are: 1. *C. glabra*, White Smooth Chelone; 2. *C. obliqua*, Red Oblique-leaved Chelone; 3. *C. hirsuta*, Hairy Chelone; 4. *C. penstemon*, Forking Chelone.

The first has a pretty thick jointed root, which creeps under ground to a considerable distance, sending up smooth channelled stalks, which rise about two feet high, with two leaves at each joint, standing opposite without foot-stalks; these are three inches and a half long, and about three quarters of an inch broad at their base,



Painted by Syd Edwards

London Published Sep 1st 1845, by G. Kearsey Fleet Street

Engraved by E. D. S. & Co.

Chelone obliqua.
1 Red flowered Chelone.

Colchicum autumnale.
2 Autumnal Crocus.

Catananche cerulea.
3 Blue Catananche.



Painted by J. E. Smith

Engraved by J. E. Smith

Engraved by J. E. Smith

2 *Chelidonium Glaucum*
Yellow Horned Poppy

1 *Cistus ladaniferus*
Gum Cistus

where they are broadcast, diminishing gradually to a sharp point; they have small serratures on their edges, which scarcely appear. The flowers grow in a close spike at the end of the stalks; are white, and almost like those of the Foxglove. It is a native of North America.

According to some, it varies with white flowers, with rose-coloured flowers, with red flowers, and with purple flowers.

In the second species, the roots do not creep so far as those of the first: the stalks are stronger, the leaves much broader, and oblique; they are deeply sawed on their edges, and stand upon short foot-stalks: the corolla is of a bright purple colour, and consequently makes a finer appearance than the above sort. It is a native of Virginia.

The third species resembles the first; but the stalks and leaves are very hairy, and the flower is of a purer white. It is a native of New England.

Some assert this to vary with white flowers, with blue flowers, with red flowers, and with purple flowers.

The fourth has a cylindric, pubescent, upright stem, a foot and half high, putting out several side branches: the leaves are oblong-lanceolate, ending in a point: the flowers in short loose spikes from the divisions of the stalks, and of a purple colour. It is a native of North America.

They all flower in the autumn, from September to November.

Culture.—The mode of propagation in the three first species is by the roots, which multiply easily, being parted in autumn, or early in spring, and planted where they are to remain: but the fourth sort must be raised annually from seed, by sowing it in autumn as soon as perfectly ripened.

The plants rise the following spring, and may be planted out in the borders during the summer months. They are hardy plants, and succeed in most soils and situations.

All these plants have a very ornamental effect for some time in autumn, after the principal bloom of most others is over; and, from being of different colours, produce much variety when planted in the borders of pleasure-grounds.

CHENOPODIUM, a genus comprising plants of the hardy herbaceous ornamental kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Holotraceæ*.

The characters are: that the calyx is a five-leaved perianthium, concave, permanent: divisions ovate, concave, membranaceous on the margin: there is no corolla: the stamina consist of five subulate filaments, opposite the leaves of the calyx, and of the same length: anthers roundish,

twin: the pistillum is an orbiculate germ: the style two-parted, short: stigmas obtuse: there is no pericarpium: the calyx closed, five-cornered, five angled; (angles compressed) deciduous: the seed single, lenticular, and superior.

The species most worthy of cultivation for ornament are: 1. *C. Scoparia*, Flax-leaved Goose-foot, Belvidere, Summer, or Mock Cypress; 2. *C. Botrys*, Cluster-leaved Goose-foot, or Oak of Jerusalem: 3. *C. Ambrosioides*, Mexican Goose-foot, or Oak of Cappadocia.

The first rises with upright round stalks, closely branching pyramidally from the bottom upwards, to the height of two or three feet, set with very narrow, linear, spear-shaped, plane, entire green leaves, and spikes of small greenish flowers. It is a native of Greece, flowering in July.

The second species sends up several stems from the root, which rise about two feet high: the leaves are light green, and alternate: the flowers axillary from the upper part of the branches, in loose racemes. They appear in July, and the seeds ripen in September. The leaves emit a very strong odour when bruised, somewhat like that of Ambrosia. It is a native of the South of Europe.

The third has the stem from twelve to eighteen inches high, sometimes reddish, round, striated, with fine scattered hairs: the leaves are pale green, oblong, sinuated; at the base of each, peduncles an inch long, on which are several little heads of flowers alternately disposed, with a leaflet under each. It is a native of Mexico.

Martyn says that "the leaves and flowery heads of both these plants have a strong and not unpleasant smell, and a moderately aromatic taste, somewhat bitterish."

Culture.—These sorts are all readily raised from seed sown in the full ground in March, on a bed of rich light earth, and raked in lightly. When the plants are two or three inches high, they may be planted out singly in different parts of the borders; but it is probably a better practice to put the seed in in patches where the plants are to flower, thinning them afterwards to a single plant in each place. In the first sort, some plants may also be planted in pots, to be set out in assemblage with other potted annuals: and a few plants of the other two sorts may be treated in the same way, in order to move them to the shelter of a greenhouse or garden-frame.

The shrubby sorts have but little beauty.

CHERRY TREE. See PRUNUS.

CHERRY-LAUREL. See PRUNUS.

CHESTNUT. See FAGUS.

CHESTNUT, HORSE. See *ÆSCULUS*.

CHINA PINK. See *DIANTHUS*.

CHINA ROSE. See *HIBISCUS*.

CHIOCOCCA, a genus containing a plant of the ornamental flowering shrubby exotic kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a five-toothed, superior, permanent perianthium: the corolla monopetalous, funnel-form: tube long, spreading: border five-parted: divisions equal, acute, reflected: the stamina consist of five filiform filaments, length of the corolla: anthers oblong, erect: the pistillum is an inferior, roundish, compressed germ: style filiform, length of the stamens: stigma simple, obtuse: the pericarpium is a roundish berry, compressed, crowned with the calyx, one-celled: the seeds two, roundish, compressed, and distant.

The species chiefly cultivated is *C. racemosa*, Climbing Snowberry Tree.

It rises with a climbing, branchy stem, several feet high, garnished with broad spear-shaped leaves, and flowers in a raceme, succeeded by numerous white berries of a loose texture.

There is a larger variety with smaller leaves and pale-coloured flowers.

Culture.—These plants may be raised by layers or cuttings of the young branches, which should be laid down or planted in pots during the summer months; and when well rooted, be taken off and planted in other pots, or removed into larger ones, a little water being given when the different operations are performed.

They afford ornament and variety when placed in assemblage with other stove plants.

CHIONANTHUS, a genus containing a plant of the deciduous flowering shrubby kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Scitagineæ*.

The characters are: that the calyx is a one-leaved perianthium; four-parted, erect, acuminate, permanent: the corolla is monopetalous, funnel-form: tube very short, length of the calyx, spreading: border of four divisions, which are linear, erect, acute, oblique, most extremely long: the stamina consist of two very short subulate filaments, inserted into the tube: anthers cordate, erect: pistillum is an ovate germ: style simple, length of the calyx: stigma obtuse, trifid: the pericarpium is a one-celled, round drupe: the seed is a striated nut.

The species cultivated is *C. Virginica*, Virginia Snowdrop, or Fringe Tree.

It rises in its native situation with a rough

stem, about ten feet high: the leaves are as large as those of the laurel, but of a much thinner substance; the flowers come out in May, hanging in long bunches, and are of a pure white: hence it is called Snowdrop Tree; and, from the flowers being cut into narrow segments, Fringe Tree. After the flowers have fallen away, the fruit appears, which is a dark-coloured drupe, about the size of a sloe. It is a native of South Carolina.

There are varieties, with broader, or ovate-elliptic, and with narrower, or lanceolate leaves.

Culture.—The method of propagation in this shrub is either by seed or layers of the young branches: the latter is a tedious method, as the branches do not easily strike root.

The seed should be procured from America, and sown as soon as it arrives in large pots of fresh loamy earth, half an inch deep, plunging them in a shady border, keeping them free from weeds, and giving occasional waterings, till autumn, when they should be moved to a frame, or where they can be occasionally sheltered during hard frost in winter; and in March plunged into a hot-bed, to bring them up.

The plants should afterwards be hardened gradually to the full air, and occasional shade be given from the mid-day sun at their first appearance, and water during summer, being sheltered again in the autumn and winter, when they may be pricked out separately in small pots; and after managing them in the same way another year or two, be planted out in the full ground.

The layers should be made from the young twigs of the last summer's growth; and as they emit roots reluctantly, a slit or twist should be given at the part laid in the earth, watering them well during summer, and in two years some may be rooted, so as to be taken off, and planted out.

It is a most beautiful ornamental shrub for the plantations of pleasure-grounds, and prospers in any common soil, though it is said to delight most in that of a somewhat moist loamy nature. It should be placed conspicuously, and so as to have the shelter of other shrubs, that there may be a more plentiful bloom.

CHIRONIA, a genus comprising plants of the exotic shrubby green-house kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a five-parted, erect, acute, permanent, one-leaved perianthium: leaflets oblong: the corolla monopetalous, equal: tube narrower: border five-parted, spreading: divisions ovate, equal: the stamina consist of five broad, short filaments, growing

from the tip of the tube: anthers oblong, erect, large, converging, and (after having shed the pollen) spirally twisted: the pistillum is an ovate germ: style filiform, a little longer than the stamens, declinate: stigma headed, ascending: the pericarpium is ovate and bilocular: the seeds numerous and small.

The species cultivated for ornament are: 1. *C. baccifera*, Berry-bearing Chironia, or Centaury; 2. *C. frutescens*, Shrubby African Chironia.

The first grows to the height of a foot and half, or two feet, with a quadrangular stem, and becomes very bushy, having beautiful red flowers at the ends of the branches.

It produces both flowers and fruit during most of the summer months, and sometimes ripens seeds, which are of a dark chestnut colour. It is a native of Africa.

The second species has the stem dividing above into round branches, tomentose, ash-coloured, mostly alternate, subdividing a little at top: the leaves are opposite, obtuse, fleshy, about two inches in length, sessile, frequently twice as long as the internodes: the peduncles two or three together, terminating, each having two or three bright purple flowers arising from the axils, with a pair of linear folioles in the middle: the pedicels one-flowered. It is a native of Africa.

Culture.—The plants in these different species may be raised from seeds, which should be sown in small pots of light sandy earth, plunging them in a moderate hot-bed: when they have attained some growth, air should be admitted pretty freely. It is the practice with some to remove them into other pots; but when they are suffered to remain in those in which they were sown, till they become large, they make the stronger plants. They should be afterwards gradually exposed to the open air, to be hardened, being placed in sunny situations with other plants that require little moisture. In the winter they should have the protection of a dry and airy green-house, and be very sparingly watered.

They may likewise be increased by cuttings planted in pots of the same sort of earth in the spring, aided by the assistance of a hot-bed, and the same kind of management as in the former mode.

In these methods of management they mostly flower the second year, and afford much ornament and variety among other curious plants of the exotic kind.

CHRISTMAS ROSE. See **HELBORUS**.

CHRIST'S THORN. See **RHAMNUS**.

CHRYSANTHEMUM, a genus containing

plants of the flowering herbaceous annual and perennial, as well as the shrubby kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common hemispherical, imbricate: scales close incumbent; the interior ones larger by degrees; the innermost terminated by a parched scale: the corolla compound radiated: corollets hermaphrodite tubular, numerous, in the disk: females more than twelve in the ray: proper of the hermaphrodites funnel-form, five-cleft, patulous, length of the calyx: of the females strap-shaped, oblong, three-toothed: the stamens, in the hermaphrodites, filaments five, capillary, very short: the anthers cylindric, tubular, shorter than the corolla: the pistillum, in the hermaphrodites, an ovate germ: style filiform, longer than the stamens: stigmas two, revolute: in the females, an ovate germ: style filiform, equal with the hermaphrodites: stigmas two, obtuse, revolute: there is no pericarpium: the calyx unchanged: the seed solitary, oblong, without any pappus: the receptacle naked, dotted and convex.

The species cultivated for ornament are, chiefly, 1. *C. coronarium*, Annual Garden Chrysanthemum; 2. *C. serotinum*, Late-flowering Creeping Chrysanthemum; 3. *C. Monspeliense*, Montpellier Chrysanthemum, or Ox Eye; 4. *C. corymbosum*, Corymbed Chrysanthemum; 5. *C. frutescens*, Shrubby Canary Chrysanthemum, or Ox Eye; 6. *C. flosculosum*, Bastard Shrubby Chrysanthemum.

The first has a furrowed stem, leafy, branching, three feet high: the leaves are smooth, stem-clasping; pinnae either pinnate or pinnatifid, the end one very large, bifid, with the pinnales sharply gashed: the peduncles terminating, one-flowered: the flowers of different colours. It is a native of Sicily, &c.

The second species has a perennial creeping root: the stem strong, branched, erect, somewhat villose, three or four feet high: the leaves are sessile, smooth; on some plants with many acuminate serratures beyond the middle, on others very few towards the end only, others again quite entire: the flowers on the ends of the branches of a white colour, appearing in September.

The third is an elegant perennial plant, without scent, and is very smooth and slightly villose, with erect, branching stems, three or four feet in height: the lower leaves bipinnatifid, upper pinnatifid, one or two at top quite entire: the flowers large, white, and radiated, like those of the above.

The fourth species is perennial, having an erect stem, from eighteen inches to two or three feet high, or more: the leaves are alternate, pinnae pinnate to the middle, the segments sharply toothed: the stalks are terminated by corymbs of large white flowers. The whole plant is without smell or taste, flowering in July and August. It is a native of the South of France, &c.

The fifth has a shrubby stem, near two feet high, dividing into many branches: the leaves are of a grayish colour, cut into many narrow segments: the flowers axillary, standing upon naked peduncles singly, and greatly resembling those of common Chamomile. There is a succession of these for a great part of the year, for which it is chiefly esteemed. It is a native of the Canary Islands.

The sixth species is a procumbent, evergreen undershrub, two feet in height: the leaves obovate, gradually narrowing into the petiole, sinuate-toothed and stiffish: the flowers small, terminating, solitary, and of a deep yellow colour. It is a native of the Cape of Good Hope.

There are varieties with single and double flowers, both white and yellow; with fistular florets, termed Quill-leaved Chrysanthemum.

Culture.—The first or annual kind may be propagated either by seeds or cuttings, but the latter method is the more expeditious, and of course more commonly practised.

In the first mode the seed should be sown in the early spring months on a very moderate hot-bed, or under hand glasses, and continued so late as the latter end of April, in a sunny situation in the open ground. It may be put in in small drills or on the surface, the mould being previously made fine and even, and the seed sown thin, and evenly covered in to the depth of nearly half an inch. When the plants are of sufficient growth, as in May, or the following month, they may be planted out singly in the situations where they are to flower. A little water should be occasionally given, both while in the beds and when planted out, especially when the weather is dry in the latter case.

In order to have fine double sorts, care should be had to remove all the bad flowers from about them as soon as they can be ascertained, leaving only one or two good ones in a place; and to have them fine in pots, they should be removed into them as soon as they can be known, with large balls of earth about their roots, a little water being given at the time.

In the latter method, which is constantly employed for continuing the double sorts so that they may blow early in the succeeding summer, cuttings of the strong side shoots about three inches long, which have not flowered, should

be planted in large pots near the tops, not too nearly together, in the early autumnal months, as the latter end of September, a little water being given at the time; the pots being removed into a frame or green-house for protection during the winter, and air freely admitted in proper weather. About the beginning of April they should be removed from the pots into the situations where they are to flower, being planted out singly. In this culture they flower much earlier than when raised from seed.

Some plants should however always be raised from seed, in order to afford cuttings to increase the double sorts from, and thereby avoid their degenerating.

The seed made use of should constantly be collected from the best and most full double flowers.

The three following species are capable of being increased either by sowing the seeds in March in beds of fine mould, in warm sunny situations, or by dividing the roots and planting them out in the autumnal months, when the season is open and rather moist. The plants in the former of these modes should be transplanted into other beds in the latter end of summer, and set out to the distance of ten or twelve inches, in order to be removed in the autumn following into the places where they are to flower.

The two last species are easily increased by planting cuttings of the young branches in pots filled with good rich earth, any time during the spring or early summer months, proper shade and water being given. When the plants are well rooted in the beginning of the autumn, they should be removed and planted in separate pots, and during the winter placed under the protection of a deep garden frame or green-house.

The first sort affords plants well suited for ornament in the beds or borders of pleasure-grounds or other places, as they produce many flowers and continue late in the autumn; and though they are annual when produced from seeds, the cuttings, as has been seen, when planted out in the autumn continue the winter, and flower earlier in the ensuing summer than the plants raised by seed.

The three following sorts are proper for the borders of extensive ornamented grounds, as they produce an agreeable variety a considerable length of time in autumn, and are of a large as well as hardy growth.

The two last are adapted for green-house collections, where they afford variety among other potted plants.

CHRYSOBALANUS, a genus containing a plant of the exotic tree kind. The Cocoa Plum.

It belongs to the class and order *Jeosandria*

Monogynia, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved, bell-shaped, five-cleft perianthium, divisions expanding, withering: the corolla has five petals, oblong, flat, spreading, inserted by their claws into the calyx: the stamina consist of very many stamens, placed in a circle, erect, inserted into the calyx: anthers small, twin: the pistillum is an ovate germ: style of the shape and length of the stamens; inserted laterally at the base of the germ: stigma obtuse: the pericarpium is an ovate drupe, large, one-celled: the seed a nut ovate, marked with five furrows, wrinkled, five-valved.

The species cultivated is the *C. Icaco*, Cocoa Plum.

It is an irregular shrub, from three to ten feet high, covered with a ferruginous bark with pale spots: the leaves ovate-roundish, obtuse, entire, coriaceous, shining, on very short petioles, alternate, two inches long: racemes branched, corymboid, lax, terminating and axillary, short; the last common peduncles three-flowered: the flowers are inodorous, small, with white petals, having almost the character of the plum: fruits roundish, about an inch in diameter, either quite entire, or with five, six, or seven grooves; red, purple, yellow, whitish, or variegated, but never blue, as described by Catesby. It is a native of the Caribbee Islands.

There are two varieties of this with compound leaves, and of tall shrubby growth.

Culture.—These plants are increased by planting the stones or nuts of the fruit procured from abroad in pots of light earth in the early spring, plunging them in a very moderate hot-bed, occasional waterings being given. When the plants are of proper growth, as three or four inches in height, they should be removed and put in other pots of a small middling size, separately, being re-plunged in the hot-bed, proper shade and moisture being given till they become perfectly rooted.

They must be kept constantly in the heat of the stove, and managed as other exotics of the same kind; water should be given them frequently during the summer months, but only in small proportions at a time. In winter it should be very sparingly employed, lest it make them throw off their leaves.

They afford variety in the hot-house collections.

CHRYSOCOMA, a genus comprising plants of the flowery herbaceous perennial and shrubby kinds.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common hemispherical, imbricate; scales linear, outwardly convex, acuminate: the corolla compound tubular, longer than the calyx: corollets hermaphrodite, tubular, numerous, equal. Proper funnel-form: border five-cleft, revolute: the stamina consist of five filaments, filiform, very short; anthers cylindric, tubular: the pistillum is an oblong germ, crowned: style filiform; scarce longer than the florets: stigmas two, oblong, depressed, involute: there is no pericarpium: calyx scarcely changed: the seeds are solitary, ovate-oblong, compressed: pappus hairy: the receptacle is naked, flat.

The species cultivated are: 1. *C. Linosyris*, German Goldy Locks; 2. *C. comaurea*, Great Shrubby Goldy Locks; 3. *C. cornua*, Small Shrubby Goldy Locks.

The first has a perennial root: the stalks rise two feet and a half high, are round, stiff, and closely garnished with long, narrow, smooth leaves, which come out without any order, of a pale green colour: the upper part of the stalk divides into many slender peduncles, each sustaining a single head of flowers, of a bright yellow colour, and disposed in form of an umbel. The plant, when handled, affords a very fine aromatic smell. It is a native of Germany.

The second species rises with a ligneous stalk, about a foot high, dividing into many small branches, which are garnished with narrow leaves, of a deep green, coming out on every side without order: the back part of each leaf has a small short appendix, which runs along the stalks: the flowers are produced at the end of the branches, on slender naked foot-stalks, and are of a pale yellow colour. It flowers a great part of the year, and the seeds ripen well in autumn. It is a native of the Cape.

The third is a less plant than the above; it has a shrubby stalk, branching out in the same manner: the leaves are shorter, and a little hairy: the flowers are not half so large, of a pale sulphur colour, and nod on one side before they are blown. It flowers a great part of the year, and ripens seeds well. It is a native of the Cape.

Culture.—The first species may be raised by sowing the seed in a bed of light mould during the early spring months, or by dividing the roots, and planting them out in rather moist open weather in the autumn.

The other sorts may be increased by planting cuttings of the young shoots in pots of light rich earth in the spring or summer months, plunging them in a slight hot-bed, or covering them with hand glasses till they have stricken root. They may afterwards be planted out in separate pots.

The first sorts are capable of being employed in the shrubbery, borders, and the latter in the green house.

CHRYSOPHYLLUM, a genus containing a plant of the exotic tree kind. Golden Leaf or Star Apple.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a five-parted, small perianthium: leaflets roundish, obtuse, permanent: the corolla monopetalous, bell-shaped: border five-cleft (ten-cleft): segments roundish, very much expanded, shorter than the tube: the stamina consist of five filaments, subulate, placed on the tube, converging: anthers roundish, twin, incumbent: the pistillum is a roundish germ: style very short: stigma obtuse, subquincifid: the pericarpium is a globular berry, ten-celled, large: the seeds solitary, bony, compressed, marked with a scar, and shining.

The species cultivated is *C. Cainito*, Broad-leaved Star Apple.

It has a woody, branching stem, growing many feet high in its native situation, having spreading, slender, declining branches, garnished with alternate spathated leaves, quite entire, downy underneath, satiny and gold-coloured; and bunches of flowers which are succeeded by large globular, eatable fruit.

It varies with different coloured fruits, as reddish, purple, and blue.

Culture.—These plants are increased by sowing the seeds, procured from the native situations of the plants, in pots filled with light good mould, in the spring, plunging them in a tan hot-bed. When the plants have attained a few inches in height, they should be planted out singly into other pots, a little water being given at the time, with a due degree of shade, and the pots replunged into the hot-bed. They should afterwards have water in moderate proportions, when necessary, and sufficient shade; being kept constantly in the hot-bed of the stove. And as they increase in size, they must be removed into larger pots, and have the management of other tender exotic plants.

These plants produce a fine effect in the stove, from the singularity of their leaves, but they seldom flower.

CIBOULS. See **ALLIUM**.

CICHORIUM, a genus comprising a plant of the herbaceous esculent kind. Succory or Endive.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Semifusculosæ*.

The characters are: that the calyx is common calyced cylindric: scales eight, narrow-lanceolate, equal, forming a cylinder; and five others incumbent and shorter: the corolla compound flat, uniform: corollules hermaphrodite twenty, in a ring: proper monopetalous, ligulate, truncate, deeply five-toothed: the stamina consist of five capillary filaments, very short: anther cylindric-pentagon, tubulous: the pistillum is an oblong germ: style filiform, the length of the stamens: stigmas two, revolute: there is no pericarpium: the calyx cylindric, converging at top: the seeds solitary, compressed, with sharp angles: pappus obscurely hairy, slightly five-toothed (many-leaved, and as it were composed of a double row of leaves): the receptacle somewhat chaffy.

The species cultivated for culinary use is *C. Endivia*, Broad-leaved Endive, or Succory.

It has an herbaceous, annual stem, two feet high, upright, round, thick, and branched: the root-leaves many, large, subcuneiform, sinuate-toothed, smooth on both sides; the uppermost lanceolate and small, of a whitish green colour, thick and crisp, like coss lettuce: the flowers are pale blue, solitary, and peduncled. It is at most a biennial plant; but if the seeds be sown in the spring, they will flower and produce seeds the same year, and perish in the autumn. This is more proper for culinary uses than sallads, and not so hardy as the green curled variety: it is mostly cultivated only for autumn use. It is a native of China and Japan.

There are other varieties, as with green curled leaves, which form a circular cluster close to the ground, twelve or fifteen inches in diameter; the centre leaves being numerous, very closely placed, and growing to a large, compact, finely-blanchéd, white heart. This is a fine hardy variety, mostly cultivated for sallads and other culinary purposes. But the great point is, to have the true sort; as some have long, irregular, thinly-placed leaves, very little curled, and the heart open and loose. In saving seed, the fullest-leaved, most curly, regular, bushy plants, that bottom well, and have the heart perfectly full, close, and white, should therefore be chosen; the white curled, which is smaller, having white, very fringy, curled leaves, in a circular cluster close to the ground, ten or twelve inches in diameter, very full and close in the heart.

Culture.—These plants are raised from seed, which should be sown at different times, from the beginning of June to the end of the following month, upon beds of fine rich mould. And some, in order to have very early plants, make a sowing about the middle of May. But, when the sowings are made too early, the plants are

apt to run to seed; and when they are deferred too long, they do not attain a sufficient growth before they are set out.

All these separate sowings should be performed in as open exposures as possible, the ground being prepared by digging it over into proper beds, and reducing the earth well at the time. The seed should then be sown thinly over the surface, and lightly raked in. In the light sorts of soil, it is the practice of some to tread it in.

Occasional slight waterings should be given when the weather is dry, and the plants kept clear from weeds, and properly thinned, so as not to draw up too fast. When they are of sufficient growth, as from four or five to six inches in height, they should be planted out where they are to remain; which for the more early plantings should be as open as possible; but for the later crops, the more southern sheltered aspects should be preferred.

For this purpose, the ground should be rich and mellow, being formed into beds about four feet in width, by digging over to a good spade's depth: a line should then be extended the whole length; and the plants, after being taken up with their roots as perfect as possible, and their tops and roots trimmed when necessary, be set out in rows, ten or twelve inches distance each way, by means of a dibble, a good watering being given immediately afterwards, when the season is dry. In this mode each bed will contain four rows of plants. But they may be planted without having the land formed into beds: the raised bed method is however preferable, especially for the winter crops, and where the soil is inclined to moisture, as keeping the plants more free from stagnant wetness, and preventing their rotting in the winter. In these cases they are often planted at smaller distances, as six or eight inches. Some likewise, for the late crops, form a sort of banks, sloping towards the south, having the breadths of four or five feet, in which the plants are set out in rows as above. In this way the plants stand more dry, and are capable of being protected by frames and mats with greater facility, when the severity of the winter renders it necessary. Where they have been set out close in these cases, some may be drawn out in such a manner as to leave the rest standing at the proper distance, which may be planted again in a warm border about February. When plants of this sort are set out in dry weather, it is a good method to make shallow drills, in order that the moisture may be more perfectly retained.

Crops should be planted out in some of these methods every fortnight or three weeks, from

about the middle of June till the beginning of October, or later; by which means they will come forward in perfection, from the later summer months till the spring following.

The only culture that is afterwards necessary, is merely that of keeping the plants free from weeds, by proper hoeing; and when they have attained their full growth, tying them up, in order that they may be effectually blanched, and rendered sweet and tender.

Blanching the plants.—This depends almost wholly upon the hearts of the plants being kept perfectly secluded from the action of light, which has been attempted in many different methods, as by tying up the leaves of the plants close together with pieces of bass; by earthing the plants well up; by placing plane tiles or boards flat upon them, and by transplanting the full-sized plants into the sides of raised ridges, putting them in the earth nearly up to their tops. The two first modes are chiefly employed in the autumn and spring crops, and the last in the winter.

The two first are the most effectual methods when performed in a perfect manner, as, while they render them quite white and crisp in a regular manner, they do not cramp or restrain their growth: the latter is chiefly to be employed in dry soils, and should be done at two or three different times.

In the third, the hearts are rendered sufficiently white and tender, but the growth of the plants is too much restricted, and the business is not performed in so regular or effectual a manner. The last is useful, when there is danger of the plants rotting, by an excess of moisture. In whichever way the etiolation of these vegetables is performed, it should constantly be done when the plants are quite dry, in the middle of a fine day, as, when done while they are wet, much loss and injury is sustained by their rotting. They mostly become well blanched in the course of a fortnight, or sooner where the light has been wholly excluded.

In very severe winters, it is of great use to cover the plants with some light material, so as to prevent their rotting, and being destroyed.

These plants may be well preserved in this season, also by being placed in dry sand, in a shed, cellar, or other convenient place.

In saving the seed of these plants, great care should be taken to collect it from the best and most perfect of the different varieties, and to have it perfectly ripened, as without care in this last respect it never answers well as seed.

CINERARIA, a genus furnishing plants of the herbaceous and shrubby kinds for the greenhouse.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common simple, many-leaved: leaflets equal: the corolla compound radiated: the corollets hermaphrodite, equal, numerous in the disk: female ligulate, the same number with the leaves of the calyx, in the ray: proper of the hermaphrodite funnel-shaped, with an erect, five-cleft border: female ligulate, lanceolate, toothletted at top: the stamina in the hermaphrodite, filaments five, filiform, short: anther cylindric, tubulous, five-cleft at top: the pistillum in the hermaphrodite is an oblong germ: style filiform, the length of the stamens: stigmas two, almost erect: females, germ oblong: style filiform, short: stigmas two, oblong, bluntish, revolute: there is no pericarpium: calyx unchanged: the seeds solitary, linear, and quadrangular: pappus hairy, copious: the receptacle naked, and flattish.

The species are: 1. *C. maritima*, Sea Cineraria, or Ragwort; 2. *C. amelloides*, Blue-flowered Cineraria, or Cape Aster; 3. *C. lanata*, Woolly Cineraria.

The first has many woody stems, two or three feet high, divided into many branches, which have a white downy bark. The leaves are very woolly, six or eight inches long, deeply sinuated, and jagged on their borders. The stems which support the flowers are a foot or more in length, having two or three small leaves on each, shaped like those below, and terminated by many yellow flowers growing in panicles, or rather corymbs, shaped like those of common Ragwort; appearing from June to August. It is a native of the Mediterranean.

There is a variety with higher and more woody stems, broader leaves, and smaller flowers; but it is not so hardy.

The second species has the stem of a purplish colour, rough, dividing into many branches near the root, so as to form a low bushy plant, seldom rising more than two feet high; but the branches extending more than a foot on every side: the leaves about an inch long, and a third part of an inch broad, thick, succulent, rough, sessile, generally two, but sometimes three at a joint, or even four, two being larger and two smaller. Towards the upper part of the branches arise the peduncles, from four to six inches long, naked, each supporting one flower, the ray of which is of a fine sky blue, and, after it has been some time expanded, turns back towards the calyx. Martyn says, "it is never without flowers the whole year!"

The third is a plant of moderate growth, but

which, Martyn observes, 1. in the beauty of its blossoms far eclipses all the others cultivated in gardens: its petals, exteriorly, are of a most vivid purple, interiorly white. It flowers early in the spring, and, by proper management, may be made to flower the whole year through. It is a native of the Canary Islands.

Culture.—The plants in these different species are all capable of being increased either by seeds or cuttings, but the latter is the more ready method. The seeds should be sown in the early spring season in pots of light earth, plunged into a very gentle hot-bed; and when the plants are of sufficient growth, they should be removed singly into other pots, a little water being given.

The cuttings may be planted in pots of the same sort of earth during the summer season, or in the borders in warm shaded situations: when they have stricken good roots they may be removed into pots, in order to be protected in the winter months. When treated too tenderly, these plants are apt to become weak.

These plants afford variety when set out in assemblage with other sorts in pots, or the two first may be planted out in warm sheltered situations in the open ground during the summer; but they must be protected from frosts in the winter season in some way or other.

The third is valuable for the green-house, as being hardy, flowering readily, and easily propagated by cuttings.

CISTUS, a genus affording plants of the shrubby evergreen kind. Rock Rose.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a five-leaved permanent perianthium: leaflets roundish, concave; of which two alternate ones are lower and smaller: the corolla has five petals, roundish, flat, spreading, very large: the stamina consist of numerous capillary filaments, shorter than the corolla: anthers roundish, small: the pistillum is a roundish germ: style simple, the length of the stamens: stigma flat, orbiculate: the pericarpium is a roundish capsule, covered with the calyx: the seeds numerous, roundish, and small.

The species are: 1. *C. populifolius*, Poplar-leaved Cistus, or Rock Rose; 2. *C. laurifolius*, Bay-leaved Gum Cistus; 3. *C. ladaniferus*, Spanish Gum Cistus; 4. *C. incanus*, Hoary Rock Rose, or Rose Cistus; 5. *C. halimifolius*, Sea Purslain-leaved Cistus; 6. *C. Monspelienis*, Montpellier Gum Cistus; 7. *C. Creticus*, Cretan Ladaniferous Cistus; 8. *C. albidus*, White-leaved Cistus; 9. *C. crispus*, Curled-leaved Cistus; 10. *C. salvifolius*, Sage-leaved Cistus.

In this numerous genus there are other species that may equally deserve cultivation.

The first has a stiff, slender, woody stem, six or seven feet high, sending out many branches the whole length: these and the leaves are hairy; the calyxes also very hairy: but the branches and leaves, when further advanced, become naked: the leaves are large, of a light green colour, sessile, with many nerves: the flowers are produced at the ends of the branches, on naked peduncles: the corolla is white, and soon drops off; and the petals, according to Linnæus, are tinged with purple on their edges; the stamens yellow; and the calyxes, before they unfold, three-cornered in their appearance. It is a native of Portugal, flowering in June and July.

The second species rises with a strong woody stem, to the height of five or six feet, sending out many erect hairy branches: the leaves are lanceolate, acute, thick, dark green above, and white beneath, very glutinous in warm weather; but, according to Linnæus, wrinkled, green on both sides, and scarce visibly hairy; the petioles becoming purple at the base: the flowers are produced at the ends of the branches upon long naked peduncles, branching on their sides into smaller ones, each sustaining one large white flower with a hairy calyx. It flowers in June and July, and is a native of Spain.

The third grows to the height of five or six feet, with a strong woody stem, sending out many hairy branches: the leaves are smooth on their upper side, but veined on their under, on short foot-stalks which join at their base, where they form a sort of sheath to the branch: the corolla is white, the size of the officinal Poppy: the germ has ten swellings: stigma sessile, without any style. It is a native of Spain, &c. It flowers from June till August.

Mr. Curtis objects to the propriety of the name *ladaniferus*, as it is not the plant from which *ladanum* is produced, though in a warmer climate it affords a gum of a similar kind.

There are varieties with large white flowers, and a purple spot in the middle of the petal, and with entire white flowers.

The fourth species has a shrubby stem, branching to a large bushy head, three or four feet high: the branches villose: the leaves are not at all nerved, ending in a point, a little flexuose in the disk, ending at the base in coalescent sheathing petioles, or rather obovate-spatulate; the lower more connate, and in a manner sheathing: the calyxes hairy, with subcordate leaflets: the petals purple, emarginate or obcordate, quite entire and concave. It is a native of Spain.

The fifth species is an upright shrub, three or

four feet high: the branches are round, ash-coloured, angular at top, the younger ones dotted with yellow: the leaves are petioled, opposite, lanceolate, very white, scarcely soft, without veins, obtuse, flat, about an inch in length: the peduncle terminating, compound, white; supporting three or four bright yellow flowers, which appear in June and July. It is a native of Portugal.

There are varieties with numerous leaves and sulphur-coloured flowers, and with yellow flowers with purple spots in their bases.

The sixth rises with a slender stem, from three to four feet high, sending out many hairy branches from the bottom upwards: the leaves are very dark green, in warm weather covered with a glutinous sweet-scented substance: the peduncles, which come out at the ends of the branches, are long, naked, and sustain many white flowers, rising above each other; their calyxes are bordered, and end in sharp points. It flowers from June to August, and is a native of Narbonne.

There is a variety with olive-shaped leaves and sulphur-coloured flowers.

The seventh species is branching, diffused, a foot and half high and more: the stem and branches round, and somewhat villose: the leaves from broad stem-clasping, petioled, first spatulate, then ovate or lanceolate, somewhat acute, wrinkled, sometimes waved, roughish, thickish, quite entire, viscid, closely set on both sides and round the edge with white hairs of different lengths, some simple, others branched or headed, scarcely visible to the naked eye: peduncles one-flowered, terminating the last leafy twigs, erect and villose: the flowers of a rose purple-colour: these appear in June and July, and the seeds ripen in September. It is a native of the Levant.

This is the species from which the drug called *ladanum* is procured.

The eighth has a shrubby stem, branching from bottom five or six feet in height: much resembling the fourth, but differing in the branches being tomentose, not hairy: the leaves paler, soft, horizontal, sessile, by no means either petioled or sheathing, broad-lanceolate, mostly three-nerved: the flowers long from the branches, of a bright purple colour: it is a native of Narbonne, &c.

In the ninth, the branches are weak, slender, woody, spreading horizontally: it is seldom more than two or three feet in height: the peduncles and calyxes are covered with a thin wool: the flowers are of a purple or white colour, appearing in June and the following month. It is a native of Portugal.

The tenth has a slender, smooth stem, co-

e M

vered with a brown bark, never rising more than three feet high, and sending out many weak branches, spreading horizontally. The leaves are obtuse, without veins, not so soft as in many other species: the peduncles lateral, solitary, one-flowered, longer than the leaves; the corolla is white, and somewhat smaller than that of the other rock-roses. It flowers from June to August, and is a native of Italy, &c.

Culture.—All these sorts are capable of being either raised by seeds or cuttings in common earth, or on hot-beds; but the seed method produces the best plants. The seeds should be sown in the early spring, in a warm border near half an inch deep, and the plants will come up in six weeks; or, to render them more forward, in pots, and plunged in a moderate hot-bed. When the plants are of some growth, they should have the full air in mild weather, and frequent waterings, as well as occasional shade from the sun, while young; and when an inch or two high, some may be planted out separately in small pots, others in rich borders, occasional shade and water being given during summer. In autumn the potted plants should be removed to a frame, to have shelter from frost. Those in the full ground should also be shielded in frosty weather with mats. In spring, those remaining in the seed-bed should be planted out, and those in pots shifted into larger ones; to be continued another winter, and in the spring following be planted where they are to remain.

In the latter method, cuttings, five or six inches long, should be planted in beds of rich earth, occasional shade and water being given. When well rooted, they should be removed into separate pots; but by being planted in pots in spring, and plunged in a hot-bed, they are rendered much forwarder. In other respects they require the same management as the seedlings.

These are beautiful evergreen shrubs, effecting a fine variety at all seasons, both from their leaves being of different figures, sizes, and shades of green and white, and their being very profuse in most elegant flowers, which though of short duration, there is a daily succession of new ones for a month or six weeks on the same plant; and when these different species are employed, they exhibit a constant bloom for near three months.

They are mostly hardy enough to prosper in the open ground in any dry soil; and if they have a sheltered situation it will be an advantage, as in open exposures they are rather subject to injury from very severe frost; for which reason a plant or two of each sort should be potted, to have shelter in winter in the green-house.

The second and fifth are the most tender sorts.

In shrubby borders and clumps they should be placed towards the fronts, in assemblage with other choice shrubs of similar growth. All the sorts should be suffered to assume their own natural growth; the straggling branches being only cut in with a knife.

CITHAREXYLON, a genus which furnishes a shrub of the ornamental evergreen kind, for the stove. Fiddle Wood.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a one-leaved perianthium, bell-form, five-toothed, acute, permanent: the corolla is one-petalled, funnel-wheel-form; tube twice as long as the perianth; thicker at the top: border five-parted, two-lipped; segments above villose, oblong, truncate, flat, very spreading: the stamina have four filaments, with the rudiment of a fifth from the middle of the tube, filiform, two of them somewhat longer: anthers oblong, twin, erect: the pistillum is a roundish germ: style filiform, the length of the stamens: stigma obtuse-headed: the pericarpium is a roundish berry, somewhat compressed, one-celled: the seeds two, ovate, two-celled, convex on one side, concave on the other, emarginate at the end.

The species cultivated is *C. quadrangulare*, Square-stalked Fiddle Wood.

It rises, in its native situation, to the size of a tree; but in this climate, only to that of a shrub. The head is handsome and branching: the branches are garnished by three oval spear-shaped leaves at every joint, standing in a triangle, upon short foot-stalks, about four inches long, and one or two broad, of a lively green colour, pretty much notched on their edges, having several deep veins running from the midrib to the edges; they are of a white colour on their upper side, and very prominent on their under. The flowers come out from the sides, and also at the ends of the branches, in loose bunches, which are succeeded by small pulpy berries, which are red when ripe. It is a native of the West Indies.

Culture.—The plants of this sort are capable of being increased both by seeds and cuttings of the young branches, but the latter is the method mostly employed.

The seeds should be sown in small pots, filled with rich earth, early in the spring, when they can be procured from abroad, plunging them into a tan hot-bed. When the plants are of sufficient growth, they should be carefully taken up and removed into other pots, separately re-plunging them in the hot-bed, shading them till they have formed fresh roots. They should after-

wards have plenty of air admitted, and be frequently watered in warm weather. They require to be kept in the bark stove the first winter; but afterwards they will bear being exposed in the open air, in a warm situation, a little in the summer, and in the dry stove in winter.

The cuttings may be planted in small pots of the same sort of earth during the early summer months, plunging them in a tan hot-bed. They afterwards require the same management as the seedling plants.

These plants afford variety in the stove in the winter season, by their fine evergreen leaves.

CITRUS, a genus comprehending plants of the Citron, Lemon, and Orange Tree kind.

It belongs to the class and order *Polyadelphia Icosandria*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leaved, five-cleft perianthium, flat at the base, very small, withering: the corolla has five petals, oblong, flat, spreading: the stamens have usually twenty filaments, subulate, compressed, erect, placed in a ring or cylinder, united generally into fewer or more bunches: anthers oblong: the pistillum is a superior, roundish germ: style cylindric, the length of the stamens: stigma globular, nine-celled within: the pericarpium is a berry with a fleshy rind, the pulp bladdery, nine-celled: the seeds in couples, sub-ovate, callous.

The species usually cultivated are: 1. *C. Medica*, Citron Tree; 2. *C. aurantium*, Orange Tree; 3. *C. decumana*, Shaddock Orange.

The first, in its wild state, is a tree that grows to the height of about eight feet, erect and prickly, with long reclining branches. The leaves are ovate-oblong, alternate, subserrate, smooth, pale green: the flowers white, odoriferous, on many-flowered, terminating peduncles: the fruit a berry, half a foot in length, ovate, with a protuberance at the tip, nine-celled or thereabouts; the pulp white, commonly acid; the rind yellow, thick, hardish, odoriferous, irregular. The fruit is esculent both in the raw and preserved state. It is a native of all the warmer parts of Asia.

Martyn says there are several varieties of the Citron which are procured from Genoa, which is the great nursery of this, as well as Lemons and Oranges; the cultivators of them there being as fond of introducing a new variety into their collections as nurserymen are here of obtaining a new Pear, Apple, or Peach.

The Citron Tree with sweet fruit, with sour fruit. The common Lemon and the Lime.

The first of the two latter varieties, or the Lemon Tree, differs, according to Martyn, from the

Orange, both in the naked footstalks of the leaves, and in the shape and colour of the fruit; but there is scarce any distinction between it and the Citron.

The most remarkable sub-varieties cultivated in this climate are, according to the same author: the Sweet Lemon, plain and variegated, the Pear-shaped, the Imperial, the Lemon called Adam's Apple, the Furrowed, the Childing, and the Lemon with double flowers.

The second, Sour Lemon or Lime, grows in its native climate to the height of about eight feet, with a crooked trunk, and many diffused branches, which have prickles on them: the leaves ovate-lanceolate, almost quite entire: the petioles usually linear: the flowers few together, on terminating peduncles: corolla oblong, white, with a purplish spot. It is a native of Asia, but common in the West Indies.

There is another sub-variety, the Sweet Lime, which the same writer says is generally a more upright tree, and bears a fruit which in size and form seems to hold a mean between the Lime and the Lemon.

These two last sub-varieties are however but little cultivated here.

The second species is a middle-sized evergreen tree, with a greenish-brown bark, dividing upwards into a branchy regular head: in its native country the branches are prickly: the leaves are broad-lanceolate, almost quite entire, smooth, with the petioles commonly winged: peduncles many-flowered, terminating: the corolla white: the stamens twenty, connected in several parcels: the berry, or fruit, sub-globular, flattened, of a golden colour, shining, odorous, three inches in diameter, divided within into about nine cells, filled with a bladdery pulp, having a sweet-acid juice in it: the rind is fleshy, of a middling thickness, covered with a pellicle which is somewhat biting and bitter to the taste. It is a native of India.

There are numerous varieties, but those most known in garden culture are: the Seville, the China, the Willow-leaved or Turkey, the Yellow and White Striped-leaved, the Curled-leaved, the Horned, the Double-flowering, the Hermaphrodite, and the Dwarf or Nutmeg Orange.

The first affords a large, rough-rinded, sour fruit, of excellent quality for culinary uses. It is a handsome grower, and the hardiest of the Orange tribe, as it shoots freely here, producing large and beautiful leaves, and flowers stronger and more abundantly, and generally bears a greater quantity of fruit than any other sort, and arrives to greater perfection.

The second has moderate-sized leaves, and a

smooth, thin-rinded, sweet fruit, of which there are several sub-varieties in warm countries, where they grow in the open ground.

The Willow-leaved Orange Tree, with narrow spear-shaped leaves, and Striped Willow-leaved Orange.

The Horned Orange is a common-sized tree, producing oblongish fruit, which divide at the end, the rind running out into divisions like horns.

The Hermaphrodite Orange is a common-sized tree, producing fruit partly like an Orange, and partly Citron-shaped.

The Dwarf or Nutmeg Orange has a low stem, and small bushy head, growing two or three feet high, with small oval leaves in clusters, and numerous flowers in bunches, covering the branches, succeeded by very small fruit. This, when in flower, is proper to be placed for ornament in rooms or other places, which it perfumes with its flowers; but it requires care, and is seldom in a perfect state of growth.

The Striped and Double-flowered varieties are most curious.

The third species, in its native situation, is a tree above the middle size, with spreading prickly branches. The leaves are ovate, sub-acute, seldom obtuse, very seldom emarginate, smooth, scattered: petioles cordate-winged, the wings as broad as the leaves: the flowers are white, very sweet scented, in copious upright terminating bunches: corolla reflex: stamens about twenty, nearly equal to the petals, collected into a many-cleft tube: the berry or fruit spheroidal, frequently retuse at each end, eight inches in diameter, of an even surface, greenish yellow, divided into twelve or more cells, containing some a red, others a white pulp, the juice in some sweet, in others acid. It is a native of India, introduced into the West Indies by Captain Shaddock.

Martyn says that there are many varieties of it, "one of which, superior to the rest in the flavour and smell of the fruit, has a smaller trunk, and sub-globular fruit, five inches in diameter, yellow on the outside, white, and very sweet within."

Culture.—The method principally practised in this climate for raising all these sorts of trees, is that of budding them upon stocks raised from the seeds; but they are likewise sometimes increased by the operation of inarching. New varieties are constantly raised from the seed.

Raising new Varieties and Stocks. Some seed should be provided from the most perfectly ripened fruits of the different sorts that are wanted early in the spring, at which time it should be sown in pots filled with good light earth, being covered to the depth of about half an inch,

plunging them in a tan hot-bed, giving them slight sprinklings of water and a free admission of air. When the plants have attained a tolerably strong growth, which is mostly in about eight or ten weeks, they should be gradually hardened to bear the full air, in which they may be continued till the weather renders it necessary to remove them into the green-house.

Some, however, in order to get them forward more rapidly, prick them out singly, when about two inches in height, into other pots, and plunge them into a second tan hot-bed, watering and giving them fresh air occasionally, and gradually hardening them as in the preceding manner. In this way they become large plants the following year.

But when the first mode is practised the plants should, in the following spring, about the middle of March or the beginning of the following month, be shaken carefully out of the seed-pots, so as to preserve the roots as entire as possible, and planted separately in small pots, made about half full with a compost of mellow loamy earth, and afterwards filled up with the same sort, so as to support the plants well, shade and water being occasionally given, till they become perfectly established. It is the custom with some, in order to have the plants more forward as well as more straight and upright, to plunge the pots, as soon as the plants have been placed in them, in a tan hot-bed, covered by frames and glasses, fresh air and water being duly supplied.

In these modes the plants are capable of furnishing good stocks for budding upon the second or third year. And where two hot-beds are made use of, many of them will be in a proper state for the purpose the second year. See **Budding**.

For the purpose of stocks, the Citron, Lemon, and Seville Orange, are said to be the best, as being the strongest shooters, especially the last.

When any of the plants appear particularly handsome and of healthy growth, they may be let remain, for the purpose of affording new varieties; but they are long in this way of raising them before they produce fruit; and when that happens, there is great uncertainty of their possessing any valuable qualities.

After the plants have been thus propagated, they only require the same management as other exotics of the green-house kind.

Method of budding them on the Stocks. The plants, when they have acquired twelve or fifteen inches growth, and are about the thickness of a large goose quill or rather more, are proper for the purpose. The buds should be procured

from sound, plump, young shoots of such trees as have a free growth, and are in a state of bearing. The operation should be performed about August, upon stocks of the same kinds and varieties, the buds being inserted from six to ten or more inches from the bottom, in proper parts of the stocks, and only one bud in each. See **BUDDING**.

After this has been done, the plants should be removed into the green-house, frame, or old tan hot-bed, in order to guard them from wet, and promote the inosculation of the vessels, and the healing of the parts; due shade and air being occasionally given; and when the union is perfectly accomplished, the ligatures removed, to permit the swelling of the plants without injury.

There is nothing more necessary than the application of proper supplies of moisture and air, with suitable protection from rain.

When the heads of the stocks have been removed in the early part of the following spring, the buds begin to shoot with vigour, especially where the aid of a tan hot-bed can be had recourse to. The plants should now be enured by degrees to the full air, for the latter part of the summer, and in the autumn and winter have the protection of a green-house.

Method of raising by Inarching, when this mode is employed, which is now but seldom, as the budding practice is much more convenient.

In this method, the young shoots of the trees raised in the above modes, which are nearly of the same size as the stocks, should be inarched with them in the early spring months, being so bent and connected with the trees, as to constitute a sort of arch. In the latter end of summer they are mostly in a state to be taken off from the parent tree. See **INARCHING**.

By this mode, the trees may be raised to a bearing state in a short time, as the young bearing branches may be made use of for the purpose, by which a new bearing tree is at once produced.

And different sorts may be connected, and produced on the same tree. But the trees furnished in this way are never so beautiful as those procured by that of budding.

Method of Culture in trained Trees. In order to have trees of this sort at once, it is the custom to purchase such as are brought from Italy, &c. in chests in the spring. They are of different sizes, and, when properly managed, produce as good trees in two years, as those raised in the above modes can in a great many.

In choosing these trees, those which shoot the most vigorously are mostly of the Citron or Shaddock kind; as the Orange rarely grows

with such luxuriance. The last, therefore, as being more valuable, should be attended to. And as some are only furnished with one bud, while others have two, the latter should be preferred, as they will produce the most regular-headed plants.

These trees, after having had their roots cleaned, trimmed, and well soaked in water for some time, as well as the stems and branches cleaned, should be planted separately in tubs or pots of suitable sizes, filled with earth of the same sort as mentioned above, watering them at the time, and plunging them in the tan-bed of the stove to the tops of the pots, &c. They should continue in this situation some time, and be well watered, both at the bottom and over the heads, shade being given when necessary, and a due proportion of air when they begin to shoot in the heads. These should likewise be cut occasionally, in order to induce them to throw out lateral branches, and form full handsome heads, air being now more freely admitted, to render the plants hardy, and capable of being preserved in the green-house during the following winter; being managed as other plants of the exotic green-house sort.

Method of Management in all the Sorts. As these trees require to be moved into different situations, it is mostly proper to have them in pots or large tubs; and where there are suitable glass frames for protecting them in winter, a few may be planted out against walls, which have flues that can be heated as there may be occasion. None of the sorts can be preserved in the open air only during a few of the summer months. The management in which cases is that of placing them in some warm public situation, at first washing their heads well, to remove dust or other substances, supplying them frequently with a little water when the season is hot, and preserving the moisture in the earth of the pots, by covering it with new cut short grass.

When they are removed to the green-house, on the approach of the autumn or winter, they should be deposited in a regular order; the largest to the back parts; proper supplies of air and water being given when the weather is suitable, and due protection provided against frost. It is occasionally necessary to water them over head, to remove all sorts of insects and other substances that may be upon their leaves, when all the decayed parts should be wholly removed.

Whenever the earth in the pots or tubs begins to bind or become stiff, it should be loosened to the depth of a few inches, and in the spring it is useful to remove a little of the surface, replacing it by such as is fresh.

It becomes necessary to shift the plants into larger pots or tubs of fresh earth, every second or third spring, about April, removing them with the balls of earth entire; the outside matted mouldy roots being pared off close, and part of the old earth at top, sides, and bottom, taken away: then the tubs or pots being cleaned out, or new larger ones provided, some crooked pieces of tiles should be laid over the holes at bottom, and some earth put in; placing the trees in the pots or tubs, and filling them up with more compost, pressing it down on the sides, giving a moderate watering at the tops, and retaining the plants in the green-house till the weather becomes sufficiently fine.

Such trees as have thin, straggling, or irregular heads should be pruned, so as to have the branches moderately short, and to form better heads.

But when they appear in an unhealthy state, with weak shoots, irregular heads, and small ill-coloured leaves, they should be pruned pretty close, and shifted into entire fresh earth; the roots being soaked and washed well in water. When they have been again planted, they should have a little water given immediately, and be plunged in a bark hot-bed, to remain until July, when they will have made strong shoots, and have formed new, full, and regular heads.

When the trees in pots have attained a large size, they should be shifted into tubs, hooped with iron hoops, having strong hooked iron handles at the tops, to receive poles to lift the trees by.

As there is often an abundance of flowers on these trees, when they appear in June and the following months, it may be proper to thin them a little, by taking off the smallest; and as the trees continue blowing and setting fruit for some time,—when a full crop is set, it is of benefit to the trees and fruit, to gather off the superabundant blossoms as they are formed.

In planting trees of this kind in the full ground, there must be frame erections for the support of glass or other coverings to defend the plants in inclement weather: in these situations the trees, from their having full scope for their roots, generally shoot strong, and produce large fruit, being trained within as wall or standard-trees.

The walls, for this purpose, should have a southern aspect, and be in a dry situation; and for the greater protection of the trees in severe frosts, there should be a fire-place, with a flue carried along a low wall in the front and ends; the trees being planted in the full borders against the back-walls, and their branches trained to them, five or six inches distance, air and

occasional water being given, as for those in the green-house, and the glasses put on in nights in bad weather, the flues only being made use of in sharp frosts, and then with very moderate fires, so as just to prevent their injurious effects.

Having managed them in this way during the autumn, winter, and spring seasons, they should about the beginning of June have the glasses removed, and the borders should be raised a little where the soil is wet, and be slightly dug over two or three times a year; necessary supplies of manure being given.

For standard trees, a more capacious and lofty glass covering should be erected against the wall, somewhat in the manner of hot-houses, only higher; a border being made the whole width and length, planting one or two rows of trees lengthways in it, suffering them to run up as standards, only giving a little pruning, just to preserve regularity.

Some have for this use lofty moveable glass-frames, so that two or three rows of trees can be planted in some conspicuous part of the pleasure-ground, the frames being taken wholly away in summer, so as to appear a little Orange-grove. And when the trees are well protected by the glasses, and other occasional coverings, &c. in winter, they grow in this way to a much greater height than those planted in tubs, or other methods.

The Citron trees should have warmer situations than the Orange during the winter, and be retained in the house later in the summer, at which period they should also have rather more water.

The common Lemon trees, as being more hardy than the Orange, of course require more air in the winter season.

CIVES. See **ALLIUM**.

CLARY. See **SALVIA**.

CLAYEY EARTH, that sort of earthy material that is chiefly composed of clay; which, from its stiff, adhesive and retentive nature, is very indifferently adapted to the growth of garden vegetables. See **SOIL**.

CLEMATIS, a genus comprehending plants of the herbaceous flowery perennial and shrubby kinds of hardy growth.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx: the corolla has four petals, oblong, lax: the stamina consist of very many subulate filaments, shorter than the corolla: anthers growing to the side of the filaments: the pistillum has very many roundish, compressed germs, ending in subulate styles, longer than the sta-

mens : stigmas simple : there is no pericarpium : receptacle headed, small ; the seeds very many, roundish, compressed, furnished with the style, in various forms.

The species chiefly cultivated are : 1. *C. Viticella*, Purple Virgin's Bower ; 2. *C. Vioora*, Leathery-flowered Virgin's Bower ; 3. *C. Orientalis*, Oriental Virgin's Bower ; 4. *C. Virginiana*, Virginian Virgin's Bower ; 5. *C. crispa*, Curled-leaved Virgin's Bower ; 6. *C. cirrhosa*, Evergreen Virgin's Bower ; 7. *C. Flammula*, Sweet-scented Virgin's Bower ; 8. *C. erecta*, Upright Virgin's Bower ; 9. *C. integrifolia*, Entire-leaved Virgin's Bower.

The first has the stems very slender and weak, with many joints, whence come out side branches, which are again divided into smaller ones. If these be supported, they rise to the height of eight or ten feet : the leaves branch out into many divisions, each having a slender foot-stalk, with three oval entire leaflets : four foot-stalks generally arise from the same joint, two on each side ; the two lower have three of these divisions, so that they are composed of nine leaflets ; but the two upper have only two opposite leaves on each, and between these arise three slender peduncles, each supporting one flower. It grows naturally in the woods of Spain, &c. flowering in June and the following month. It has the title of Virgin's Bower, from its fitness for constituting such ornaments.

There are cultivated varieties with single blue, single purple, single red, and with double purple flowers.

The second species has many slender stems, sarmentose, round, striated, prostrate or climbing : the leaflets are three-lobed, divided to the petiole, smooth, paler underneath, entire, sometimes gashed, but commonly somewhat sinuated and waved, the nerve of the side-lobes not in the middle, but nearer to the inner side : peduncles long, solitary, axillary, with one pair of simple leaves in the middle : flowers solitary, nodding, coriaceous, ribbed on the outside, never opening, except at the end, where the petals are bent back ; they are of a greenish purple on the outside, and very pale green within.

It is a native of Carolina, &c. flowering from June to September, ripening seeds in fine seasons.

The third has weak climbing stalks, rising to the height of seven or eight feet when they are supported : the leaves consist of nine leaflets, which are angular and sharp-pointed, glaucous on both sides, with such soft slender hairs on them as are not easily either seen or felt : the flowers drooping, and of a yellowish green colour, with a tinge of russet on the upper part

or outside. It flowers from July to October, and is a native of the Levant.

The fourth species has climbing stems, very high : the leaves are ternate : leaflets thinly but deeply serrate-angular, naked, cordate, veined : floral leaves simple, six together or subverticillate, quite entire, three-lobed or undivided : the flowers are of a white colour, and spreading. It is a native of North America, &c. flowering from June to August.

The fifth has weak stalks, which rise near four feet high, and by their claspers fasten themselves to neighbouring plants : the flowers come out singly from the sides of the branches upon short peduncles, having one or two pair of leaves on them, which are oblong and sharp-pointed : the corolla is purple, the inside is curled, and has many longitudinal furrows. It is a native of Carolina, &c. flowering in July, and ripening seed in September.

The sixth species has a climbing stalk, rising to the height of eight or ten feet, sending out branches from every joint, whereby it becomes a very thick bushy plant : the leaves are sometimes single, sometimes double, frequently ternate, serrate ; keeping their verdure all the year : the tendrils come out opposite to the leaves : the flowers are produced from the side of the branches ; are large, and of an herbaceous colour, appearing at the end of December, or beginning of January. It grows naturally in Spain.

The seventh is rather creeping than climbing. It is lower and more tender than some of the other species : the leaves are also smaller, with five and seven pinnae, or three-lobed, or three-leaved ; the leaflets ovate-lanceolate, with few gashes, and one or two teeth : the flowers are of a white colour, sweet-scented, and appear from July to October. It is a native of the South of France, &c.

The eighth species has a perennial root : the stems are herbaceous, annual, round, scarcely branched, from three to five feet high, firm, ending in a panicle at top : the leaves are opposite, and pinnate ; the leaflets from two to four pairs, with an odd one at the end, petioled, lanceolate or ovate, acute, the upper surface smooth and green, the lower somewhat villose and glaucous ; they are entire, seldom two-lobed : the flowers are of a white colour at the ends of the stalks ; come out in June, and ripen seeds in winter. It is a native of France, &c.

There is a variety, with only two or three pairs of leaflets, which are narrower, and stand further asunder, having shorter stalks and larger flowers.

The ninth has a perennial root : the stems are

several, annual, a foot and half high or more, striated, erect, a little fistulose, somewhat pubescent at top, terminated by a nodding flower of a blue colour, and sometimes branched in the upper axils. The leaves are opposite, ovate, sessile, quite entire, nerved, veined, acute, smooth, except about the edge and on the dorsal nerves, which are slightly villose. It is a native of Germany, &c. flowering in July.

Culture.—The Purple Virgin's Bower, and its different varieties, as well as the six following sorts, are capable of being increased by layers, and some of them even by cuttings of the young shoots.

In the first method the layers should be made from the shoots of the preceeding or the same year, and be laid down in the summer before they become woody, as in this way they succeed with greater certainty. The branches should have their tops left a few inches out of the earth, a little water being given at the time. When they are become well rooted, as in the following autumn or spring, they may be taken off, and planted out where they are to remain, or in the nursery.

The evergreen sort may however be laid down at any season, but the above is the best. It is also capable of being raised from cuttings of the young shoots planted out in either the spring or summer months in pots of good earth, plunging them in a very moderate hot-bed. The suckers from the roots may likewise be taken off and planted out in the same manner as the layers, when they will often produce good plants.

The two last sorts are capable of being readily increased by parting the roots, and planting them out either in the autumn or the early spring months. In this way every part which has fibres preserved at the bottom, and a bud in the upper end, will readily take root and become a plant.

These sorts, as well as some of the others, may also be propagated by sowing the seeds either where the plants are to remain, or in a spot of good mould in the early autumn or spring season, in the latter case removing the plants into their proper situations when of sufficient growth. In this mode the plants are, however, longer in arriving at the flowering state. The roots may be divided every two or three years, according to the number of divisions that are made. Where the soil is dry, the plants should be new planted in the autumn; but in the contrary circumstances, in the spring, in order to make them flower strong.

All these plants are of hardy growth, and capable of succeeding in almost any sort of soil. The climbing sorts require proper support, to

prevent their trailing upon the ground, and are well adapted for ornamenting naked walls, arbours, or other similar places, as well as for running upon trees or shrubs in particular situations.

The two last sorts are well suited for ornament in the clumps and borders of pleasure-grounds, to be set out singly.

CLEOME, a genus affording plants of the herbaceous annual exotic kind for the stove.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Putamineae*.

The characters are: that the calyx is a four-leaved perianthium, very small, spreading; the lower leaflet gaping more than the rest; deciduous: the corolla four-petalled: all the petals ascending, spreading; the nearest intermediate ones smaller than the others: nectarous glands three, roundish, one at each division, except one at the calyx: the stamina consist of six filaments, (sometimes twelve or twenty-four,) subulate, declining: anthers lateral, ascending: the pistillum is a simple style: germ oblong, declining, the length of the stamens: stigmas thickish, rising: the pericarpium a long siliqua, cylindric, placed on the style, one-celled, two-valved: the seeds are very many, and roundish.

The species mostly cultivated are: 1. *C. triphylla*, Three-leaved Cleome; 2. *C. pentaphylla*, Five-leaved Cleome; 3. *C. heptaphylla*, Seven-leaved Cleome.

The first is an annual plant which rises two feet high, sending out many side branches, with leaves, having one large spear-shaped lobe in the middle, and two very small ones on the side; these sit close to the branches: the flowers come out singly from the sides of the branches, upon long peduncles, and are large and flesh-coloured. Procured from Jamaica.

The second species is an annual, elegant but fetid plant, upright, either wholly smooth or with a few hairs at bottom; the stem round and branching: the leaves on the stem and branches all quinate; the leaflets obovate, acute, very finely serrate: floral leaves ternate, obovate, obtuse, quite entire; the lowest on short petioles, the rest sessile: the racemes of flowers very long, formed by solitary, spreading, one-flowered peduncles issuing from some of the axils, of a white or flesh-colour. It is a native of both the East and West Indies.

The third has an herbaceous stem, from three to five feet high, branched, upright, angular-grooved: the branches sub-divided, spreading, grooved, hirsute, viscid and prickly: the leaves are alternate, scattered, spreading, digitate: leaflets lanceolate, acuminate, nerved, patulous, pubescent: the flowers white or flesh-coloured,

terminating in long loose spikes. It is a native of Jamaica, flowering in June and the following month.

There are other species in this genus that may be cultivated.

Culture.—These plants, which are of the annual sort, are raised by seeds, which should be sown in pots of light earth in the early spring, being plunged in a moderate hot-bed; and when the plants are of a few inches growth they should be removed into separate pots, and re-plunged in the hot-bed. When they have attained sufficient growth, they should either be removed to the stove or be placed in the green-house, or even in the open air, during the hot summer months while they are in flower; in any of which they produce a good effect.

CLETHRA, a genus containing a plant of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leaved, five-parted perianthium: leaflets ovate, concave, erect, permanent: the corolla has five petals, oblong, broader on the outside, from erect spreading, a little longer than the calyx; the upper one broadest: the stamina consist of ten subulate filaments, the length of the corolla: anthers oblong-erect, gaping at the top: the pistillum a roundish germ: style filiform, erect, permanent, increasing: stigma trifid: the pericarpium is a roundish capsule, involved in the calyx, three-celled, three-valved: the seeds are very many, angular.

The only species is *C. alnifolia*, Alder-leaved Clethra.

In this the roots spread far on every side, and send up many stems, from eight or ten to fourteen feet high, which are covered with a grayish bark, and divide into small round alternate branches. The leaves are about three inches long, and an inch and quarter broad in the middle; they are of a deep green on their upper side, and of a whitish green underneath, alternate, and on very short petioles. The flowers are on loose spikes from four or five inches to a span long; the petals are white. They appear in July, and, when the season is mild, some spikes are produced in October. It is a native of North America.

Culture.—This is propagated either by seeds, layers, or suckers.

In the first mode the seeds, procured from America, should be sown in pots of light earth, and removed into the shade during summer, and

shelter in winter, as sometimes the plants do not come up till the second spring after they have been sown.

The layers should be made from the young shoots in autumn, and water given them the following summer; and in the autumn after, or when well rooted, they should be taken off and planted out in separate pots, or in places where they are to remain.

The suckers from the roots may be removed in the autumn or early spring months, fibres being preserved to them as much as possible, being planted out in pots or other places where they are to remain.

It is a very ornamental shrub, particularly during the time of its bloom, but should have a rather moist soil.

CLIFFORTIA, a genus furnishing plants of the evergreen exotic shrubby kind for the green-house.

It belongs to the class and order *Diœcia Polyandria*, and ranks in the natural order of *Tri-coccæ*.

The characters are: that in the male the calyx is a three-leaved perianthium: leaflets ovate, acute, coriaceous, spreading, deciduous: there is no corolla: the stamina have about thirty capillary erect filaments, the length of the calyx: anthers twin, oblong, obtuse, erect, compressed. In the female the calyx is a three-leaved perianthium, equal, erect, superior, permanent: leaflets acute, lanceolate: there is no corolla: the pistillum is an oblong, inferior germ: styles two, filiform, long, plumose: the stigmas are simple: the pericarpium is an oblong capsule, nearly columnar, two-celled, crowned with the calyx: the seeds solitary, nearly columnar, linear.

The species principally cultivated are: 1. *C. ilicifolia*, Hix-leaved Cliffortia; 2. *C. trifoliata*, Three-leaved Cliffortia.

The first is a shrub with alternate declining branches, clothed with truncated membranes and stipules. The leaves are alternate, sheathing very shortly at the base, roundish, having seven or nine teeth terminated with spines, spreading, recurved at the end, flat, cartilaginous about the edge, nerved, smooth, biennial, horizontally deciduous, leaving a reddish permanent sheath. The flowers are lateral, axillary, sessile, solitary, of a greenish yellow colour.

The second species has slender, woody, procumbent stems, silky with hairs, sending out slender branches on every side. The leaves are sessile, hairy, the middle leaflet much broader than the two side ones, which are lanceolate.

The flowers are axillary, on very short peduncles, of a yellowish green colour, coming out in July and August. Male plants mostly cultivated.

Culture.—The propagation in these plants may be effected either by cuttings or layers of the young shoots. The first should be planted in pots of good light mould either in the spring or summer months, plunging them in moderate hot-beds.

The layers should be laid down in the spring, and, when perfectly rooted, taken off and set out in pots as in the other way.

Their further management is that of keeping them in the protection of the green-house, watering them freely in summer, but very sparingly during the winter season.

All these plants are very ornamental in their flowers, especially the male ones, producing a fine effect in the green-house collections.

CLIMBING PLANTS, such plants as ascend either spirally round supports, or by means of clasps and tendrils.

They are either herbaceous or woody; and which, according to their mode of climbing, may be denominated Twining Climbers, Cirrhous Climbers, and Parasitic Climbers.

The first are such as have winding stalks, and twist about any neighbouring support, such as scarlet kidney-beans, hops, and some sorts of honeysuckle.

The second are such as ascend by means of spiral strings, issuing from the sides of the stalks and branches, or from the foot-stalks of the leaves, and even from the leaves themselves, twisting about any thing they meet with, by which their stalks are supported and arrive at the proper height, such as most of the pea tribe, cucumber, vine, passion-flower, and various others.

The last are also of the same kind, but their clasps plant themselves as roots in the bark of the plants on which they ascend, or in the crevices of walls or pales, thereby supporting themselves, and mount to their tops, as the ivy, Virginia creeper, radican bignonia, and several others.

Some of these sorts of plants, both of the herbaceous and shrubby kinds, are very ornamental. The principal of the herbaceous kind are; the everlasting pea, painted lady-pea, scarlet and white kidney-bean, nasturtium, gourd, hop-plant, scarlet convolvulus, and many others.

The chief of the shrubby kinds, or such as have perennial stalks are: the radican and evergreen *bignonia*, climbing *celastrus*, different

species and varieties of virgin's-bower, kidney-bean-tree of Carolina, ivy, Virginia creeper, many sorts of honeysuckle, passion-flower, many varieties of periwinkle, the vine, and several others.

Most of the herbaceous climbers are very ornamental, and may be introduced in large borders, placing sticks for their support. The more tall growing sorts may also be employed to run over arbours or rural seats in pleasure-grounds.

The shrubby sorts are most of them proper furniture for shrubberies of considerable extent, in which they may be employed in different ways; some being dispersed in the clumps, detached from other plants, placing tall, strong stakes for their support; others placed in large borders and the boundaries of lawns, &c.; and some near hardy trees and large shrubs, to climb about their stems, or interweave in their branches and tops; in the ornamenting of naked or unsightly walls and other high buildings; and in decorating and forming rural arbours, where there is any kind of open-work for the branches to climb upon, they are likewise very useful, as they shoot very rapidly.

These sorts should many of them be kept properly cut in during the autumn and early spring months.

CLITORIA, a genus containing plants of the exotic climbing kind.

It belongs to the class and order *Diadelphie Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved, erect, tubular, five-toothed, permanent perianthium: the corolla is papilionaceous: standard very large, straight, emarginate, waved at the margin, spreading, and overshadowing the other petals: wings oblong, straight, obtuse, shorter than the standard: keel shorter than the wings, falcated somewhat roundly: the stamina are in two brotherhoods (simple and nine-cleft): anthers simple: the pistillum is an oblong germ: style ascending: stigma obtuse: the pericarpium is a legume very long, linear, compressed, one-celled, two-valved, with the tip subulate: the seeds many and reniform.

The species are: 1. *C. ternata*, Winged-leaved Clitoria; 2. *C. Brasiliana*, Brazilian Clitoria; 3. *C. Virginiana*, Small-flowered Virginian Clitoria.

The first rises with a twining herbaceous stalk to the height of four or five feet, in the manner of the kidney-bean, requiring similar support: the leaves are winged, composed of two or three

pairs of leaflets, terminated by an odd one, of a beautiful green colour, and placed alternate on the stalks: from the appendages of the leaves come out the peduncles; each encompassed by two very fine leaves about the middle, where they are bent, sustaining a very large, gaping, beautiful blue flower, the bottom part of which seems as if growing to the top. It is a native of the East Indies.

There are varieties with white flowers and with blue double flowers.

The second species has likewise a twining stem, which rises five or six feet high, having at each joint one ternate leaf on a long petiole. The flowers come out singly from the axils on long peduncles, encompassed about the middle with two small oval leaves: the flowers are very large, the standard being much broader than that of the first sort, and the two wings are larger: the flowers are of a fine blue colour, appearing in July, and in warm seasons ripening seeds in autumn. It is a native of Brasil.

The third species has an herbaceous twining stalk, with ternate, oblong-pointed leaves, with three or four whitish purple flowers on short footstalks. It is a native of Virginia.

Culture.—These plants are increased by sowing the seeds in pots of light earth, plunging them into a bark hot-bed, a little water being given at the time. When the plants are of some growth they should be removed into other pots separately, due shade being given till fresh rooted, and a proper supply of fresh air, to prevent their drawing up weak. When they are become large they should be removed into the bark-bed of the stove, and be properly supported with sticks for them to twine upon.

They afford much ornament by their beautiful flowers.

CLOVE. See *CARYOPHYLLUS*.

CLOVE-PINK. See *DIANTHUS*.

CLUSIA, a genus comprising plants of the exotic tree kind for the stove. Balsam Tree.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Guttiferae*.

The characters are: that the calyx is a four-, five-, or six-leaved perianthium, imbricate: leaflets concave, permanent, the interior ones gradually smaller: the corolla has four, five, or six roundish petals, spreading, concave, large: the stamens consist of many simple filaments, shorter than the corolla: the anthers are simple, growing to the side of the tip: the pistillum is an ovate-oblong germ: style none: stigma starred, flat, obtuse, permanent: the pericar-

pium is an ovate capsule, marked with furrows, celled, the valves bursting in a radiate manner: the seeds are numerous, ovate, covered with pulp, affixed to a columnar angulated receptacle.

The species are, 1. *C. flava*, Yellow-flowered Balsam Tree; 2. *C. venosa*, Vein-leaved Balsam Tree.

The first in its native situation grows to the height of twenty feet, and shoots out many branches on every side, with thick, round, succulent leaves, placed opposite. The flowers are produced at the ends of the branches, each having a thick succulent cover: these are of different colours in different plants, some being red; others yellow, some white, and some green. After the flowers are past, they are succeeded by oval fruit, which are also of different colours in different plants. It is found in Jamaica.

There are varieties with white flowers and scarlet fruit, with pink-coloured flowers and greenish fruit, and with yellow fruit.

The second in its native state rises to the height of twenty or more feet, has very large oval spear-shaped leaves, ending in points, placed alternate on the branches, having several ribs, which go off from the midrib alternate, rising upward to the side of the leaves, and a great number of small veins running horizontally between these ribs. The borders of the leaves are serrate, and their under sides of a shining brown colour. The branches are covered with a woolly down, and the flowers produced in loose spikes at the end of the shoots; these are smaller than those of the first, and of a rose colour. Found at Campeachy.

Culture.—These plants are increased by planting the cuttings of the young shoots in pots of light mould, being plunged in the hot-bed of the stove. When the plants have stricken full roots, they may be removed into other pots separately; but it is the best practice to plant them in separate pots at first.

They should be kept constantly in the stove in the bark-bed, and be only very sparingly watered, but in other respects they require the same management as other stove exotics.

CLUYTIA, a genus comprehending plants of the shrubby succulent evergreen exotic kind, for the stove and green-house.

It belongs to the class and order *Diœcia Gynandria*, and ranks in the natural order of *Tricocœæ*.

The characters are: that in the male the calyx is a five-leaved perianthium, size of the corolla: leaflets ovate, obtuse, concave, spreading: the

corolla has five petals, spreading very much, cordate: claws flat, shorter than the calyx: nectaries exterior five, three-parted, oblong, spreading, length of the claws of the petals, placed in a circle within the petals: nectaries interior five, glandiform, small, melliferous at the tip: the stamens have five filaments placed on the middle of the style, remote from the corolla, spreading horizontally: anthers roundish, versatile; pistillum has no germ: style cylindric, truncate, very long, bearing the stamens on its middle. In the female the calyx has the perianth as in the male, permanent: the corolla has also the petals as in the male, permanent: nectaries exterior five, twin, roundish, of the same size and situation as in the male: nectaries interior none: the pistillum is a roundish germ: styles three, bifid, reflex, length of the corolla: stigmas obtuse: the pericarpium is a globular capsule, six-furrowed, rough, three-celled: the seeds are solitary, roundish, even, appendiculated at the tip.

The species cultivated are: 1. *C. alternoides*, Narrow-leaved Cluytia; 2. *C. pulchella*, Broad-leaved Cluytia; 3. *C. Eluteria*, Maritime Cluytia.

The first has a shrubby stem, six or eight feet high, putting out many side branches, which grow erect: the leaves are of a grayish colour, and entire: the flowers come out from the joints, at the setting on of the leaves, towards the upper part of the branches; they are small, and of a greenish white, appearing from June to August.

The second species rises about the same height with the first, but has a stronger stem: the leaves are much larger, sea-green, and on petioles an inch long: the flowers are like those of the first sort in shape and colour, but those on the male plants are smaller, and grow closer together than those of the female, but both are sustained upon short footstalks. These flowers appear at the same time as those of the first sort, and the seeds ripen in autumn.

The third, according to Miller, rises with an upright shrubby stalk, not more than three or four feet high in this climate; but in places where it grows naturally, to upwards of twenty, with the branches forming a large spreading head: the leaves are shaped like those of the black poplar; and the flowers in spikes at the ends of the branches. It is a native of both the Indies.

Culture.—These plants are capable of being increased by planting cuttings of the young branches in pots of light fresh earth, either in the spring or summer months, giving them a

little water at the time, and plunging them in the bark-bed. When they have formed good roots they should be carefully removed into separate pots.

The two first sorts afford variety in the greenhouse, and the last in the stove; but they are all capable of being exposed in the open air during the summer months.

They are very ornamental in their evergreen leaves.

CNEORUM, a genus furnishing a plant of the low evergreen shrubby kind. Widow-wail.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Tricoccæ*.

The characters are: that the calyx is a very small, three-toothed, permanent perianthium: the corolla has three petals, oblong, lanceolate-linear, concave, erect, equal, deciduous: the stamens have three subulate filaments, shorter than the corolla: anthers small: the pistillum is an obtuse, triangular germ: style erect, firm, length of the stamens: stigma trifid, spreading: the pericarpium is a dry, globose berry, three-lobed, three-celled (three-berried drupe): the seed solitary, round (conduplicate, in a two-celled shell).

The only species is *C. tricoccum*, Widow-wail, or Spurge-Olive.

It is a humble shrub, which seldom rises more than two feet and a half high in this climate, but spreads out on every side with many lateral branches, so as to form a thick bush: the stems are ligneous, and almost as hard as those of the box-tree, and the wood of a pale yellow colour under the bark: the branches being garnished with thick stiff leaves, of an oblong oval shape, about an inch and a half long, and a quarter of an inch broad, of a dark green colour, having a strong vein or rib through the middle: the flowers are produced single, from the wings of the leaves, toward the extremity of the branches, are of a pale yellow colour, beginning to appear in May, being succeeded by others during the summer months, and, when the autumn proves favourable, continue in flower till the end of October. It is a native of the South of France, &c.

Culture.—These plants may be raised either from seeds or cuttings.

In the first mode the seed should be sown in the early autumn, on a spot of light common earth, to the depth of about a quarter of an inch. The plants mostly appear in the following spring, when they should be kept clear from weeds; and in the second spring the strongest be thinned

out and planted in the places where they are to grow, or in nursery-beds, to stand two or more years, when they will be proper for the shrubby or other places.

The cuttings should be made from the preceding year's shoots, and planted in pots of good earth, plunging them in a mild hot-bed. When well rooted, they may be removed into other separate pots, or be planted in the borders where there is a proper degree of shade, a very little water being given at the time.

Slippings of the same sort of shoots also succeed, and produce good plants when set in the same manner in the later summer months.

The plants are hardy ornamental evergreens for the fronts or borders of clumps in pleasure-grounds.

They are likewise sometimes introduced into the greenhouse for the purpose of variety. They succeed best in a rather dry soil.

COCCOLOBA, a genus containing plants of the evergreen tree and shrubby exotic kinds.

It belongs to the class and order *Octandria Trigynia*, and ranks in the natural order of *Holoraceae*.

The characters are: that the calyx is a one-leaved, five-parted perianth; divisions oblong, obtuse, concave, spreading most widely, coloured, permanent: there is no corolla: the stamens have eight filaments, subulate, patulous, shorter than the calyx: anthers roundish, twin: the pistillum is an ovate germ, trigonal: styles three, short, filiform, spreading: stigmas simple: there is no pericarpium: calyx bearded, thickened, converging, involving the seed; the seed is an ovate nut, acute, one-celled.

The species cultivated are: 1. *C. uvifera*, Round-leaved Sea-side Grape, or Mangrove Grape-tree; 2. *C. pubescens*, Great-leaved Sea-side Grape; 3. *C. punctata*, Spear-leaved Sea-side Grape; 4. *C. tenuifolia*, Small Sea-side Grape.

The first, in its native situation, is a lofty spreading branched irregular inelegantly formed tree, but rendered handsome by its leaves and fruits: the bark is cinereous and thin, in the younger trees smooth, in older ones full of chinks; the timber, hard, ponderous, and red: the leaves quite entire, ending in a short blunt point, coriaceous, thick, large, alternate, deep green, with the midrib and veins connected with it more or less scarlet, on short petioles sheathing at the base: the flowers small, whitish, smelling like those of the cherry. The berries are of the size of grapes. It is common in the sugar colonies.

The second species is an upright tree, sixty or

eighty feet high in its native situation: the head has frequently no more than two or three thick branches, but little divided and irregular: the bole is sometimes forty feet in length, and puts forth a branch or two about the middle: the timber is of a deep red, heavy, very hard, and also incorruptible, but brittle; when used for posts, the part under ground becomes hard as stone: the leaves are roundish, cordate, quite entire, very much veined and wrinkled, frequently extremely hirsute, sometimes however almost smooth, alternate, few, two feet in diameter, on a short petiole sheathing at the base. It is common in Martinico.

The third is a small upright branched tree, fifteen feet high: the leaves quite entire, subcoriaceous, veined, shining, alternate, half a foot long, commonly two or three on each flowering branchlet, on petioles sheathing at the base: the flowers are white. It is a native of Carthage.

The fourth species is of humbler growth than any of the former; the flowers and fruit being smaller than those of the other sorts; and it recedes from them in having membranaceous, not coriaceous leaves: the flowers are small, and disposed in simple axillary spikes. It is a native of Jamaica.

Culture.—These different species may be easily propagated by sowing the seeds obtained from the places where they grow naturally, in pots filled with light rich earth, in the early spring season, plunging them in a bark hot-bed; and when the plants are of sufficient growth, they should be removed into small pots, and replaced in the hot-bed, water and due shade being given them till they have stricken fresh root. Their management afterwards is the same as that of other more tender plants.

As these plants only attain a shrubby growth in this climate, and are tender, they should be constantly retained in the stove or hot-house.

They afford a good variety by the fine ever green appearance of their large leaves.

COCHLEARIA, a genus affording a plant of the herbaceous tap-rooted esculent kind.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliquosae*.

The characters are: that the calyx is a four-leaved perianth: leaflets ovate, concave, gasping, deciduous: the corolla is four-petalled, cruciform: petals obovate, spreading, twice the size of the calyx: claws narrow, shorter than the calyx, patulous: the stamens have six subulate filaments, length of the calyx: the opposite ones shorter: anthers obtuse, compressed: the pistillum is a heart-shaped germ: style simple,

very short, permanent: stigma obtuse: the pericarpium is a heart-shaped silicle, gibbous, turgid, emarginate, furnished with a style, two-celled, scabrous; valves gibbous, obtuse: the seeds about four in each cell.

The species cultivated is *C. Armoracia*, Horse Radish.

It has a creeping perennial root: the leaves are very large, varying much, sometimes deeply pinnatifid, sometimes entire, and only crenated: the flowering-stem is a foot or eighteen inches high, branching at top, almost naked: the flowers are white, in loose panicles, coming out in May.

Culture.—The culture in this plant is readily effected by planting such cuttings of the roots as contain buds or eyes. Those made from the tops, and which have the heads or crowns of the plants to them, are the best. The offsets and side shoots may likewise be employed for the purpose, as is mostly the case with market-gardeners. They should be about an inch or two in length. As these plants require to be put into the ground to a great depth, in order that they may form long fine roots, the earth should either be dug over before the cuttings are placed in, or trenched to the depth of fifteen or twenty inches at the time, according to the method of planting that is made use of.

The soils most adapted to the growth of these plants are those of the more light deep kinds; but they will succeed tolerably on almost any. Where the land has been trenched over in the above manner, the usual mode of planting is by means of the dibble; but there is another practice which is sometimes followed, which is that of trenching in the sets, or placing them in the earth at the time it is dug over.

In the first method, after the ground has been prepared, a line is stretched across, beginning at the end, and holes made to the depth of fifteen or twenty inches along it, by means of a long sharp dibble, at the distance of nine inches from each other, a set or cutting being dropped into each hole, and the mould closed upon it. The line should then be moved forward to the distance of twenty inches or two feet, and another row put in in the same manner, proceeding in the same way till the whole is completed.

In the latter the ground should be light and loose, beginning at one end of the piece, and opening a trench two spades wide, and one spade deep, digging the bottom: then a row of cuttings should be set along the middle of the bottom nine inches distant, inserting them to their tops in the earth; then digging the next trench the same width and depth, turning the earth into the first upon the row of plants, breaking

all large clods, and levelling the top. After this, proceed to the second trench, planting it in the same way, performing the whole of the work in a similar manner.

The proper season for this work is in the autumn for the dryer sorts of land, and February or beginning of the following month for such as are moist.

In these methods of planting the ground may be sown the first year with spinach, radishes, or any slight-rooting crop, that comes off early in the summer, to allow of their being kept clean afterwards by hoeing; which is all the culture they require.

Sometimes the plants make such progress as to have roots large enough for use in the course of a few months; but if not much wanted, they are better to remain a twelvemonth or more.

In taking up the roots for use, the best method is to open a trench two spades wide, close on the side of the first row of plants, and as deep as the stool or bottom of the roots, without disturbing them; then with a large knife or sharp spade to cut off all the shoots, large and small, of each stool, close and level, from whence they rise, leaving the parent stools in the earth, and after having taken up all the plants of the first trench, proceeding to the next row in the same manner, turning the earth into the first, and cutting off all the shoots as before, taking up the whole in the same way as wanted. The remaining undisturbed stools continue to send up a fresh supply of shoots in succession for many years; but after the two first years the stools begin to spread at bottom, and send up many small shoots between and in the rows; all which intervening small spawn should be annually drawn up in the beginning of summer, to render the principal shoots large and fine. And though the stools of these roots endure many years, in time they become weak or worn out, as well as the soil; consequently in six or seven years, when the shoots become weak and small, a fresh plantation should be made in some other place.

These roots are much used for culinary purposes when scraped fine.

COCOS, a genus comprising a plant of the exotic tree kind for the stove. The Cocoa-nut Tree.

It belongs to the class and order *Monoecia Herandria*, and ranks in the natural order of *Palme*.

The characters are: that the male flowers are in the same spadix with the females: the calyx is an universal, univalve spathe: spadix branching: the perianth three-parted, very small; divisions subtriquetrous, concave, and coloured: the

corolla consists of three ovate, acute, patulous petals: the stamina consist of six filaments, simple, length of the corolla: anthers sagittate: the pistillum a scarcely manifest germ: styles three, short: stigma obsolete: the pericarpium abortient: the female flowers on the same spadix with the males: the calyx is a common spathe with the hermaphrodites, as likewise the spadix: the perianth three-parted: divisions roundish, concave, converging, coloured, and permanent: the corolla consists of three petals, permanent, like the calyx, but rather larger: the pistillum is an ovate germ, no style: the stigma three-lobed: the pericarpium a coriaceous drupe, very large, roundish, obscurely triangular: the seed is a very large nut, subovate, acuminate, one-celled, valveless, obtusely three-cornered, the base perforated by three holes: the kernel is hollow.

The species are: 1. *C. nucifera*, Cocoa-nut Tree. 2. *C. aculeata*, Great Macaw Tree.

In the first the roots are very slender, simple, and flexible; arising separately from the bottom of the trunk, and spreading in all directions; some running to a great depth, while others creep almost parallel to the surface. The trees grow to a great height; their stems being composed of strong fibres like net-work, which lie in several laminae over each other, out of which come the branches, or other leaves, which grow twelve or fourteen feet long. The first leaves which push out from the nut when planted are different from those which are afterwards produced; as they are broad, and have many folds in each: whereas the after leaves have a strong midrib, twelve or fourteen feet long, on which the leaflets are placed alternately: these are from six to eight or nine inches long, and are almost triangular, having very sharp points, and very stiff. The flowers come out round the top of the trunk of the tree in large clusters; are inclosed in a large spathe or sheath, and the nuts afterwards formed in large clusters, ten or twelve together. As soon as all the parts of the flowers have gained a due degree of perfection, the spathe splits on the under side, from the bottom upwards, and exposes the common bunch, with all its flowers, to the open air: most of which are males, and fall off gradually as the spathe withers, leaving the embryo fruit generally fixed to the lower and stronger part of the stalk, to increase and ripen by degrees. It is a native of the East Indies.

The second species is a large tree in its native situation, which rises to thirty feet in height, has an ash-coloured bark, and is very thick set with sharp black prickles, of different lengths, placed usually in rings. The fruit is as large as

a crab, and of the same shape: under a green skin it has a thin sweetish astringent pulp; and within that a nut full of a white sweet eatable kernel. It is common in the Caribbee islands.

Culture.—The plants in both these sorts are raised from the nuts, which are brought hither from their native places: these are planted separately in pots of rich earth, depositing them on their edges, and plunging the pots over their rims in a bark hot-bed. They soon germinate at the holes in the bases, and appear; when frequent waterings should be given and the plants continued in the stove, shifting them occasionally into larger pots, being careful to preserve the balls of earth about their roots, and not to break the fibres of the roots in performing the business.

COFFEA, a genus affording a plant of the flowering shrubby evergreen kind for the stove. The Coffee Tree.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Stellatae*.

The characters are: that the calyx is a five-toothed perianth, very small, superior: the corolla is one-petalled, salver-shaped; tube cylindric, slender, many times longer than the calyx: border flat, five-parted, longer than the tube: divisions lance-shaped: sides rolled back: the stamina consist of five subulate filaments, placed on the tube of the corolla: anthers linear, incumbent, length of the filaments: the pistillum is a roundish, inferior germ: style simple, length of the corolla: stigmas two, reflected, subulate, thickish: the pericarpium is a roundish berry, umbilicated by a one- or two-celled puncture: the seeds one or two, solitary, elliptically-hemispherical, gibbous on one side, flat on the other, where it is furrowed longitudinally; involved in an aril.

The species cultivated is *C. Arabica*, Eastern Coffee Tree.

It seldom rises more than sixteen or eighteen feet high in its native situation, or more than ten or twelve in this climate. The main stem grows upright, and is covered with a light brown bark. The branches are horizontal, and opposite; the lower ones longest, the others gradually decreasing to the top, so as to form a pyramid: the leaves are opposite, when fully grown four or five inches long, and an inch and a half broad in the middle, ovate-lanceolate, the borders waved, and the surface of a lucid green: the flowers are produced in clusters (two to four) at the base of the leaves, sitting close to the branches; they are of a pure white, with a very grateful odour, but of short duration; being

succeeded by berries, which are first green, then red, and, when fully grown, change to black, and become ripe.

Culture.—These plants are raised from the berry, sown as soon as possible after become ripe, in pots of light rich earth, half an inch deep, plunging them in the bark-bed, and giving light sprinklings of water once a week. The plants soon appear, which, when about three inches high, should be pricked out into separate small pots, giving a little water, and replunging them in the bark-bed, shade from the sun being given, till they have taken root, and repeating the waterings moderately, as there may be occasion, with a due admission of air.

It is also capable of being propagated by layers and cuttings, which, though they emit roots rather reluctantly, deserve the trial; planting them in pots of good earth, plunging them in the bark-bed, and supplying them duly with water and occasional shade.

These plants should afterwards remain continually in the stove, having water given two or three times a week in summer, and once or twice a week in winter, and fresh air admitted in common with other exotics of the hot-house; and as they advance in growth, be placed in larger pots in proportion, shifting them into fresh earth every year or two, trimming off all dry matted roots on the outside of the balls, as also part of the old earth; then placing the plants in the pots again, filling them up with fresh compost, such as good light kitchen garden earth, giving them water, and immediately plunging the pots in the bark-bed.

As cleanliness is essential in the culture of this shrub in the stove; when it has contracted much dust or filth, all the branches and leaves should be well washed, by sprinkling water over them.

And as it is frequently attacked by insects, particular attention is necessary, when these appear, to wash and clean every branch and leaf separately, repeating it as often as necessary; but when very numerous, it is a sign of ill health and weakness in the plant, and proceeds chiefly from the root; in which case, it is advisable to shift the plants into entire fresh earth, and replunge them into the bark-bed.

This is a very ornamental plant for the hot-house, especially in autumn and winter, when in fruit.

COLCHICUM, a genus comprehending plants of the perennial flowering bulbous-rooted kind.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that there is no calyx (except scattered spathes): the corolla six-parted: tube angulated, rooted; divisions of the border lance-ovate, concave, erect: the stamens consist of six subulate filaments, shorter than the corolla: anthers oblong, four-valved, incumbent: the pistillum is a buried germ within the root: styles three, thread-form, length of the stamens: stigmas reflex, channelled: the pericarpium is a three-lobed capsule connected internally by a suture, obtuse, three-celled, sutures gaping inwardly: the seeds many, nearly globular, and wrinkled.

The species cultivated are: 1. *C. autumnale*, Common Meadow Saffron; 2. *C. montanum*, Mountain Meadow Saffron; 3. *C. variegatum*, Variegated Meadow Saffron.

The first has a bulbous root, about the size and shape of the tulip, but not so sharp-pointed at the top; the skin or cover is also of a darker colour: these bulbs are renewed every year; for those which produce the flowers decay, and new roots are formed above: the flowers come out in autumn; these arise with long slender tubes from the root, about four inches high, shaped like those of the saffron, but larger: the number of flowers is generally in proportion to the size of the roots, from two to seven or eight: in March the green leaves appear, these are commonly four to a full-grown root; they are folded over each other below, but spread open above ground, standing cross-ways: they are of a deep green, and when fully grown are five or six inches long, and one and a half broad. The seed-vessel comes out from between the leaves in April, and the seeds ripen in May, after which the leaves soon decay. It is a native of most parts of Europe.

There are varieties, with white flowers; with striped flowers; with broad leaves; with striped leaves; with many flowers; with double purplish flowers; with double white flowers; with many white flowers. The double sorts are chiefly cultivated in the garden.

The second species has a smaller root, with a darker coat: the leaves come up soon after the flowers decay, and continue green all winter; long, narrow, and spread on the ground, decaying in June: the flowers are of a reddish purple colour, and appear from August to September. It is a native of Spain, &c.

In the third the leaves are smaller than those of the common sort, for the most part three in number, and of a paler and fresher green colour, lying close upon the ground, broad at the bottom, a little pointed at the end, waved about the edges: the root is not so large as that of the common sort: the flowers are smaller, but

very beautiful, whitish, with deep blue or purple spots. It is rather tender, and blows about October or November. It is a native of the Greek islands.

Culture.—These plants are increased by dividing the bunches of their roots at the time their leaves decay, in the latter part of the summer; as from the latter end of June till the middle of the following month, planting the separated bulbs or off-sets to the depth of about three inches.

They are sometimes planted in beds, in rows at eight or ten inches asunder; but they may be dispersed in the fronts of borders and clumps with success.

It is of advantage to take up and divide the bunches of root-bulbs every two or three years. See **BULBOUS ROOTS**.

New varieties may be raised from seed sown in boxes, or large pots, in autumn, covering it a quarter of an inch deep, and placing them in a warm situation till spring, when the plants will appear, which should have only the morning sun during summer, giving water in dry weather; and in the second summer, when their leaves decay, planting them out to flower, either in beds, or other methods.

They are of a hardy nature, and produce a fine effect, by their curious growth, as well as flowers, in the autumn and winter seasons.

COLUTEA, a genus containing plants of the hardy deciduous flowering shrubby kind. **Bladder Senna**.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, bell-shaped, five-cleft, erect, nearly equal, permanent: the corolla is papilionaceous; standard, wings, and keel differ in figure and various proportion; wings pressed close together, lanceolate: the stamina have diadelphous filaments, (single and nine-cleft) ascending: anthers simple: the pistillum is an oblong germ, compressed, attenuated to each end: style ascending: stigma is a bearded line extended from the middle of the style to its tip, from the upper part: the pericarpium is a legume very large, very broad, inflated, transparent and membranaceous, the upper suture erect, the lower gibbous, one-celled, gaping on the upper suture at the base: seeds several, kidney-shaped.

The species cultivated are: 1. *C. arborescens*, Common Bladder Senna; 2. *C. cruenta*, Oriental Bladder Senna; 3. *C. Pocockii*, Pocock's Bladder Senna; 4. *C. frutescens*, Scarlet Bladder Senna.

The first has several woody stems, which grow to the height of twelve or fourteen feet,

sending out many woody branches, with winged leaves, composed of four or five pairs of oval lobes, placed opposite, terminated by an odd one; these are indented at the top in form of a heart, and are of a grayish colour. The flowers come out from the wings of the leaves upon slender peduncles about two inches long, each sustaining two or three yellow flowers, whose standard is reflexed and large, with a dark-coloured mark on it. Native of the South of France, &c.

The second species has a woody stem, which sends out many branches on every side, which do not rise above seven or eight feet high; these are not so strong as those of the first sort, and the leaves are composed of five or six pairs of small heart-shaped leaflets, terminated by an odd one. The flowers proceed from the side of the branches, standing upon peduncles, each sustaining two or three flowers, shaped like those of the first sort, but smaller; they are of a dark red colour, marked with yellow, appearing in June, the seeds ripening in autumn. It was found in the Levant.

The third is a shrub which seldom grows more than six or seven feet high in this country. The branches are very slender, and much more pliant than those of the common sort, and therefore it grows less erect. The leaves are composed of nine pairs of leaflets, and are much smaller. The flowers are of a brighter yellow, appear a month earlier than in the common sort, and there is a succession of them till late in the autumn, which renders it much more valuable; and the branches not shooting so luxuriantly nor so upright, it is in less danger of being broken by strong winds in summer. It is a native of the Levant.

The fourth species is a hoary shrub, with tomentose leaflets, smooth on the upper surface. It rises from two to four feet in height in favourable seasons and in a warm situation; plants of three years standing will sometimes be six feet high. The stem is weak, the side branches grow erect, and the leaves have ten or twelve pairs of leaflets. The flowers are sustained on axillary peduncles, three or four together, and are of a fine scarlet colour, coming out in June. It is a native of the Cape.

Culture.—All these plants are capable of being increased by sowing the seed in the early spring months, as in February for the three first sorts, and the two following months for the fourth, upon beds of common earth, covering them in to the depth of about half an inch. When the plants have attained sufficient growth, as in the following spring for the former sorts, and when they are three or four inches high

in the latter, they should be removed, and the first sorts planted out in rows in the nursery, and the last in warm sheltered situations or in pots, to be protected during the winter.

This sort may likewise be rendered much forwarder, so as to flower the same year, by having recourse to a hot-bed.

The three first species are also capable of being raised by layers from the young shoots, made either in the autumn or spring seasons; but as the fourth sort does not continue long, and is more tender than the others, new plants should be raised from seed every two or three years.

They are all beautiful ornamental plants, especially the fourth, and may be introduced into the clumps, borders, and other parts of shrubberies and pleasure-grounds, where they produce a fine effect by their foliage and flowers. The last sort should, however, have a dry warm soil and sheltered sunny situation.

COMPOSITION FOR TREES, a substance discovered, prepared, and applied by Mr. Forsyth, for the purpose of removing diseases, defects, and injuries in fruit- and forest-trees. It is directed to be composed in the following manner:

"Take one bushel of fresh cow-dung, half a bushel of lime-rubbish of old buildings (that from the cielings of rooms is preferable), half a bushel of wood-ashes, and a sixteenth part of a bushel of pit or river sand: the three last articles are to be sifted fine before they are mixed; then work them well together with a spade, and afterwards with a wooden beater, until the stuff is very smooth, like fine plaster used for the cielings of rooms.

The trees should be prepared for its application "by cutting away all the dead, decayed, and injured parts, down to the fresh, sound wood, leaving the surface of the wood very smooth, and rounding off the edges of the bark with a draw-knife, or other instrument, perfectly smooth, which must be particularly attended to; then lay on the plaster about one eighth of an inch thick, all over the part where the wood or bark has been so cut away, finishing off the edges as thin as possible: then take a quantity of dry powder of wood-ashes mixed with a sixth part of the same quantity of the ashes of burnt bones; put it into a tin box, with holes in the top, and shake the powder on the surface of the plaster, till the whole is covered over with it, letting it remain for half an hour to absorb the moisture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder till the whole plaster becomes a dry smooth surface.

"All trees cut down near the ground should have the surface made quite smooth, rounding it off in a small degree, as before mentioned; and the dry powder directed to be used afterwards should have an equal quantity of powder of alabaster mixed with it, in order the better to resist the dripping of trees and heavy rains.

Such portions of the composition as may be left for a future use "should be kept in a tub or other vessel, and urine of any kind poured on them, so as to cover the surface; otherwise the atmosphere will greatly hurt the efficacy of the application.

And "where lime-rubbish of old buildings cannot be easily got, take pounded chalk, or common lime, after having been slaked a month at least."

It is further remarked, that "as the growth of the tree will gradually affect the plaster, by raising up its edges next the bark, care should be taken, where that happens, to rub it over with the finger when occasion may require (which is best done when moistened by rain), that the plaster may be kept whole, to prevent the air and wet from penetrating into the wound."

But "as the best way of using the Composition is found, by experience, to be in a liquid state," Mr. Forsyth adds, that it should "be reduced to the consistence of pretty thick paint, by mixing it up with a sufficient quantity of urine and soapsuds, and laid on with a painter's brush. The powder of wood-ashes and burnt bones is to be applied as before directed, patting it down with the hand."

It is also advised, "when trees are become hollow, to scoop out all the rotten, loose, and dead parts of the trunk to the solid wood, leaving the surface smooth; then to cover the hollow, and every part where the canker has been cut out, or branches lopped off, with the Composition; and as the edges grow, to take care not to let the new wood come in contact with the dead, part of which it may be sometimes necessary to leave; but to cut out the old dead wood as the new advances, keeping a hollow between them, to allow the new wood room to extend itself, and thereby fill up the cavity, which it will do in time, so as to make as it were a new tree."

If the cavity be large, to cut away as much at one operation as will be sufficient for three years. But in this to "be guided by the size of the wound, and other circumstances. When the new wood, advancing from both sides of the wound, has almost met, to cut off the bark from both the edges, that the solid wood may join, which, if properly managed, it will do, leaving

only a slight seam in the bark. If the tree be very much decayed, not to cut away all the dead wood at once, which would weaken the tree too much, if a standard, and endanger its being blown down by the wind. It will consequently be necessary to leave part of the dead wood, at first, to strengthen the tree, and to cut it out by degrees as the new wood is formed. If there be any canker, or gum oozing, the infected parts must be pared off, or cut out with a proper instrument. When the stem is very much decayed and hollow, it will be necessary to open the ground and examine the roots." See DISEASES OF TREES.

Various interesting facts and observations on the advantage and utility of this Composition in the removal of the diseases of different sorts of trees, may be seen by consulting Mr. Forsyth's valuable "Treatise on the Culture and Management of Fruit-Trees."

COMPOST-GARDEN, such earthy or other substance as, when combined with manure, constitutes the means of improving the soil for the growth of plants.

As almost all sorts of plants and vegetables, though they succeed better in some kinds of soil than others, grow well in mould which is duly impregnated with vegetable materials, it is not necessary to have recourse to the composing of such substances as are tedious and troublesome in their preparation except for particular sorts of plants, whether of the esculent, flower, shrub or tree kinds.

For the purpose of improving the condition of garden grounds in general, the substances should be suited to their particular qualities and properties; as where they are of a light, loose, gravelly or sandy nature, the application of loamy and other sorts of heavy earthy matters in combination with well-rotted dung, will be beneficial; and such as are of the heavy, clayey or loamy kinds, be greatly ameliorated by the use of light sandy earth, scrapings of roads, sea-sand, ashes, the reduced bark employed in hot-beds, saw-dust, and other decayed ligneous materials, with a proper proportion of good rotten dung.

Most of the esculent sorts of plants succeed perfectly in good vegetable mould of moderate adhesion, such as is met with in gardens that have been some time under cultivation.

Some particular sorts of plants require such as is loose and light, as those of the moist bulbous-rooted tribe; others, such as is dry, sandy, or calcareous, as those of the more succulent kinds; and that of the rich loamy description is in common well adapted to the growth of most

sorts of trees and shrubby plants; and earthy compositions of the boggy kind are suited to the raising of some sorts of plants and flowers.

The composts most usually employed for the more tender curious plants, in pots, tubs, and hot-beds, are, for the less delicate kinds, such as are constituted of fresh maiden earth taken from old pasture-ground, of a light but rich mouldery quality, inclining to loam. In forming it, the top spit or turf should only be taken, to which should be added a third or fourth part of thoroughly rotten dung, the whole being laid in a long heap or ridge, three feet high, in a situation exposed to the sun and air, for several months, turning it over occasionally, that the mass may be converted to mould, and the materials be properly incorporated together. Where good pasture earth cannot be procured, a quantity of good garden-mould will answer, adding one third or fourth part of rotten dung, as that of old hot-beds; and, where the soil is of a rather stiff nature, also about a fourth part of sea-sand, drift, ashes, or rotten tan, the whole being thrown up in a heap for five or six months; but the longer the better, stirring it over several times.

For plants that require light, loose mould, composts may be formed of one-half good light pasture mould, or that of a garden, and about one-third of sand and rotten dung, forming the whole in a heap in the same way as the preceding.

Where a soft, loose, rich earth is required, Composts of good light rich earth of the garden or pasture, rotten tanner's-bark, or rotten earthy wood, saw-dust, tree-leaves, rotten dung, and a small portion of sand may be used, after being well blended together.

If dry rubbishy soils are wanted, Composts formed of one-half of perfectly light garden or pasture mould, and one-half of sea-sand or road-soil, and a little screened lime rubbish, the whole being laid in a heap for some months, and turned over two or three times, to be well mixed, may be had recourse to.

Where the heavier sorts of Composts are wanted, they may be prepared from fresh loamy earth from a common or any dry pasture-ground, where the soil is of a soft and moderately light friable nature, taking the uppermost spit, sward and all, chopping it to bits, and adding rotten dung, as above, which, after lying in a ridge or heap twelve or fifteen months, to rot the sward, and being frequently turned over to break the lumps, and mix the parts well together, may be made use of with success.

Where the culture of flowers is intended,

Composts for different curious sorts may be formed in the following manner:

For auriculas;—of light earth from pasture-ground, the top spit with the sward, and neat's dung, of each about an equal portion, and about half the quantity of drift or sea-sand, and, when it can be had, a little rotten willow earth, or any rotten earthy wood, or old rotten tan or saw-dust, forming the whole into a heap for several months, turning it over several times at intervals. This Compost is also proper for fine carnations, ranunculuses, and anemones: these flowers, however, often blow equally well in common, rich, light, garden earth.

For hyacinths;—composts formed of neat's dung and drift sand, of each an equal portion, and half the quantity of old rotten tan, are very useful. Where it can be easily procured, the same portion of rotten leaves of trees, or a little more rotten bark, and a proportionate quantity of light earth from a pasture or garden, may be used, the whole being mixed in a heap, to lie at least a year, giving it frequent turnings; but if it remains in the heap fifteen or eighteen months it will be the better. See the *Culture of different Plants*.

In Composts where sand is employed, sea or drift sand is to be preferred; and in Composts where rotten, ligneous, earthy substances are requisite, that of rotten willow-trees is the best; or old rotten tanner's bark may be substituted, as a proper ingredient.

Composts should constantly be formed in an open exposure, free to the influence of the sun, air, rains, frosts, &c. and the ingredients be made in a heap, rather extended in length, like a ridge, about a yard or four feet in thickness, being turned over frequently, and the bottom thrown to the top, that all the parts may be well mixed, and equally participate of the influence of the sun and other causes.

These composts, when used, should not be screened, except for some particular purposes, which are mentioned, being only broken fine with the spade and hands, as when fine-screened, or sifted, they become too compact for the roots of plants to spread and extend themselves in.

COMPTONIA, a genus which contains an ornamental plant of the tree kind.

It belongs to the class and order *Monoechia Triandria*.

The characters are: that in the male flowers the calyx is a cylindric ament, loosely imbricate all round with concave, kidney-form, acuminate, caducous, one-flowered scales: perianthium two-leaved: leaflets equal, boat-shaped, shorter than the scale of the ament: there is no corolla: the stamina consist of three filaments, shorter than

the calyx, forked: anthers six, two-valved. In the female flowers the calyx is an ovate ament, closely imbricate all round with one-flowered scales, as in the male: perianthium six-leaved: leaflets opposite in pairs, filiform, membranaceous at the base, many times longer than the scale of the ament: there is no corolla: the pistillum is a roundish germ: styles two, capillary: there is no pericarpium: the seed is an oval nut, one-celled, valveless.

The species cultivated is *C. asplenifolia*, Fern-leaved Comptonia.

It rises with slender shrubby stalks, near three feet high; they are hairy, and divide into several slender branches. The leaves are from three to four inches long, and half an inch broad, alternately indented (or sinuated) almost to the midrib; they are of a dark green, hairy on their under side, and sit close to the stalks. It is a native of North America, flowering here from March to May.

Culture.—This plant is propagated either by seeds or layers. In the former method the seeds should be sown about an inch deep in a bed of light earth in the spring season, and the plants will appear the following year, when they should be kept clear from weeds, and have occasional waterings in dry weather.

In the latter mode the young summer shoots should be laid in autumn in the slit method of laying, and when well rooted they may be taken off and planted out.

These plants are hardy, and capable of succeeding in almost any soil. They are introduced for variety in the shrubbery and other parts of ornamented grounds.

CONSERVATORY, a place constructed somewhat in the manner of the green-house, but more spacious and elevated, and finished in a neater and more perfect way, being designed for containing and preserving the more rare and curious sorts of plants, as well as for affording amusement by being provided with walks laid with some sort of neat material, according to the taste of the proprietor, in a serpentine or other irregular manner between the plants.

Houses of this nature should have dry and rather elevated situations, at a small distance from the residence, and be ranged in such a manner as to have the benefit of the sun as much as possible during the day. They must likewise be provided with flues, for the purpose of communicating fire heat when it may be necessary, and also valves and other contrivances for the introduction of fresh air when wanted, and to afford due ventilation.

The sides, ends, and roofs, must be formed



Painted by J. Edwards

London Published April 1846 by G. Kearsley Fleet Street

Engraved by F. Sargent

Convallaria majalis
1 Lily of the Valley.

Cerinthus major
2 Great Honeywort

with glass, as in the greenhouse, in order to admit light freely, and at the same time protect the plants.

The ground plan and elevation of an elegant and very convenient house of this sort may be seen in the annexed plate.

CONVALLARIA, a genus containing plants of the hardy herbaceous perennial flowery kind. Lily of the Valley, and Solomon's Seal.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx: the corolla is monopetalous, bell-shaped, smooth: border six-cleft, obtuse, open reflected: the stamina consist of six subulate filaments, inserted into the petal, shorter than the corolla: anthers oblong erect: the pistillum is a globose germ: style filiform, longer than the stamens: stigma obtuse, three-cornered: the pericarpium is a globose berry, three-celled, before maturity spotted: the seeds are solitary or in pairs, and roundish.

The species cultivated are: 1. *C. maialis*, Sweet-scented Lily of the Valley; 2. *C. polygonatum*, Single-flowered Solomon's Seal; 3. *C. multiflora*, Many-flowered Solomon's Seal; 4. *C. verticillata*, Narrow-leaved Solomon's Seal; 5. *C. racemosa*, Cluster-flowered Solomon's Seal.

The first has a perennial root, with numerous round fibres transversely wrinkled, creeping horizontally just below the surface to a considerable distance. The whole plant is smooth. Four or five alternate, oblong, blunt, slightly nerved, purplish scales surround and bind together the base of the leaves and stalk. There are two leaves, petioled, elliptic or lanceolate, pointed at each end, from four to five inches long, and near an inch and half broad in the middle, quite entire, upright, smooth, nerved, one usually larger, of a bright green colour; petioles clasping, round, the outer dotted with red, and tubular, to receive the inner, which is solid. Scape lateral, the length of the leaves, upright, smooth, semicylindrical. The flowers from six to eight, in a raceme, nodding, white, and fragrant. It is a native of Europe; flowering in May. Hence it is termed May, and sometimes Conval Lily.

There are varieties with narrower leaves, with broader leaves, with double variegated flowers; with double reddish or red flowers; with double white flowers.

The second species has a twisted root, full of knots: on a transverse section of it characters appear that give it the resemblance of a seal, whence the name of Solomon's Seal. The stem is from a span to near a foot in height, of a

harder texture than the third species: the leaves are simple, inclined, angular, twisted, sometimes three-edged, four inches long and one broad, oval-lanceolate, half embracing the stem, glaucous underneath, frequently bending down on one side. The flowers sweet-scented, generally solitary, but sometimes two, on long axillary peduncles, much larger than in the third sort. The berries are black. It is a native of the north of Europe.

It varies with double flowers, &c.

The third has a round stem, from eighteen inches to two or three feet high, erect and unbranched: leaves usually bent upwards, and to one side, underneath glaucous, five inches long and two broad; the lower ones oval, the upper oval-lanceolate, half embracing the stem. The flowers are several together (from two or three to seven or eight), axillary, on branched compressed peduncles. The berries round, of a blackish blue colour, purple and red.

This is a larger plant than the second sort. It is a native of the North of Europe.

There are varieties with double flowers.

The fourth sort has a perennial root, toothed: the stem is simple, angular, striated, erect, eighteen inches high. The leaves narrower than the other sorts, lanceolate, entire, smooth, three or four in a whorl, three or four inches long, and from half an inch to an inch in breadth, bright green, and glaucous beneath. The peduncles are axillary, solitary, branched, pendulous, and from two to six-flowered. The flowers of a greenish white colour. The berries violet or deep red. It flowers in June; and is a native of the North of Europe, &c.

The fifth species has the stems two feet high, unbranched, with many oblong leaves embracing them at the base, resembling the leaves of Plantain. The flowers are small and white, and are produced in single spikes at the top, and are succeeded by small red berries, about the same size as in the first sort. It flowers the beginning of June, and is a native of Virginia, &c.

Culture.—In all these sorts of plants their culture may be effected by parting their roots, either in the autumn or spring months, but the former is the better season, planting them out where they are to remain. They afterwards only require to be kept free from weeds, and removed every three or four years, according as their roots may be increased.

As they succeed best in rather shady situations, they are well suited for affording variety and ornament in shady places, such as the borders or the sides of walks in woods and wilderness parts of pleasure-grounds, producing considerable variety by the singularity of their growth and the

beauty of their foliage and flowers. They also grow well in many other situations that are more open.

CONVOLVULUS, a genus containing several plants of the herbaceous trailing annual and perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceae*.

The characters are: that the calyx is a five-parted perianthium, converging, ovate, obtuse, very small, permanent: the corolla is one-petalled, bell-shaped, spreading, large, plaited, obscurely five-lobed: the stamina have five subulate filaments, shorter by half than the corolla: anthers ovate, compressed: the pistillum is a roundish superior germ: style filiform, length of the stamens: stigmas two, oblong, broadish: the pericarpium is a capsule enveloped by the calyx, roundish, two-celled, one-two- or three-valved (commonly three-celled, seldom two- or four-celled: partition alternate with the valves): the seeds are in pairs, roundish (one or two seeds in each cell, sometimes abortive, few with a twisted embryo).

The species mostly cultivated are: 1. *C. purpurea*, Purple Convolvulus, or Convolvulus Major; 2. *C. tricolor*, Three-coloured Trailing Convolvulus, or Convolvulus Minor; 3. *C. Nil*, Anil, Blue or Azure Convolvulus; 4. *C. Canariensis*, Canary Evergreen Convolvulus; 5. *C. cneorum*, Silver-leaved Convolvulus; 6. *C. Batatas*, Tuberous-rooted Convolvulus, or Spanish Potatoes.

The first is an annual plant, that rises on support to the height of ten or twelve feet. In its native situation it sends out long branches, which twist about the trees, and rise to a great height. The leaves are smooth, heart-shaped, ending in long points; the ears at the base are large and rounded, and the petioles long and slender. The peduncles are long, each sustaining three purple-coloured flowers. It flowers from the end of June till destroyed by the frost. It is a native of America.

It is usually known in garden-culture by the name of *Convolvulus Major*.

There are varieties, with deep purple flowers, with white flowers, with red flowers, and with whitish blue flowers.

The second species is an annual plant, with several thick herbaceous stalks, about two feet long, not twining, but bending towards the ground, upon which many of the lower branches lie prostrate. The leaves are likewise sessile. The peduncles come out just above the leaves at the same joint, and on the same side; they are about two inches long, each sustaining one large open bell-shaped flower, of a fine blue colour, with a white bottom, varying to pure white, and

sometimes beautifully variegated with both colours. The white flowers are succeeded by white seeds; but in the blue ones they are dark-coloured. It is a native of Barbary, &c. commonly known in garden-culture under the title of *Convolvulus Minor*.

The third is also an annual plant, rising with a twining stalk eight or ten feet high. The leaves are woolly, ending in sharp points and on long petioles. Each peduncle sustains two flowers of a very deep blue colour, whence its name of *Anil* or *Nil*.

It is a beautiful plant; and it flowers all the latter part of the summer. It is a native of America.

The fourth species has strong fibrous roots. The stems are woody, branched, growing twenty feet high, and more when supported. The flowers are axillary, several on one peduncle, for the most part of a pale blue colour, but sometimes white. It flowers in June, July, and August, and sometimes ripens seeds here. It is a native of the Canary Islands.

The fifth has upright, shrubby stems, about three feet high. The leaves are lanceolate, blunt, silky, placed closely on every side the stem; they are near two inches long, and a quarter of an inch broad. The flowers are produced in clusters at the top of the stem, sitting very close; they are of a pale rose-colour, and come out in June and July, but do not perfect seeds in this climate.

The sixth species has a round perennial stem, hispid, prostrate, creeping, putting forth scattered, oblong, acuminate tubers, purple or pale-coloured on the outside. The leaves are angular, on long petioles. The flowers are purple, lateral, large, three or thereabouts together, on upright peduncles. It is a native of both Indies, &c.

Culture.—All the annual kinds are easily raised, by sowing the seed in the early spring months in patches, in the places where they are to flower, four or five seeds in each, half an inch deep. When the plants are an inch or two high, they should be thinned out, so as to leave but two or three of the best in each patch, managing them afterwards as other plants of similar growth.

The perennial species, which are tender, are mostly increased by layers from the young shoots in the spring, which take root freely in three or four months: cuttings of the young shoots also grow freely in a shady border, when planted during the summer months. Suckers taken from the root also make good plants when planted in the same way. They should be kept in pots of rich earth, and managed in the same way as geraniums, myrtles, and other similar plants.

The Tricolor or Minor *Convolvulus* may either be suffered to trail upon the ground, according to its natural growth, or tied up to sticks: but the other annual species and varieties, being of the twining or running kind, should have tall sticks to climb upon, on which they will rise several feet in height, flowering all the way, and appearing highly ornamental.

The perennial sorts are elegant plants for the greenhouse collection, and deserve the attention of those who can preserve them during the winter season.

The last species may be raised by planting the roots, either whole or divided, in a warm border, in the early spring months, where they will send up stalks, and flower in the autumn; but to have them in greater perfection, they should be planted in a slender hot-bed, covered with a frame and glasses during bad weather, by which means they flower earlier, and often form many tubers at the joints. They are chiefly planted for the sake of variety.

CONYZA, a genus containing a plant of the shrubby sort for the greenhouse.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, imbricate, roundish, squarrose: scales acute, the outer somewhat spreading: the corolla compound tubulose: corollæ hermaphrodite numerous, tubular in the disk: females apetalous, roundish in the circuit: proper, of the hermaphrodite funnel form: border five-cleft, patulous: of the females, funnel-form: border three-cleft: the stamens in the hermaphrodites, filaments five, capillary, very short: anther cylindric, tubular: pistillum in the hermaphrodites, an oblong germ: style filiform, length of the stamens: stigma two-cleft: in the females, germ oblong: style filiform, length of the hermaphrodite, more slender: stigmas two, very slender: there is no pericarpium, calyx converging: the seeds to the hermaphrodites solitary, oblong; down simple: to the females, solitary, oblong; down simple: the receptacle flat.

The species mostly cultivated is *C. candida*, White-leaved or Woolly Flea-bane.

There are other species that may be cultivated when variety is wanted.

It has the stem suffruticose, six inches high, upright, round, hairy, whitish, and branched: the leaves are very white, quite entire, alternate; the flowers purple, peduncled, heaped. According to Miller, the peduncles are woolly, nine inches high, one-, two-, or three-flowered; the flowers of a dirty yellow. It has a pleasant smell. It is a native of Candia.

Culture.—It may be increased by planting slips or cuttings in separate pots of good earth, the former in the spring, and the latter in the summer months, plunging them first in a hot-bed, and giving water pretty freely till they have stricken root in both methods.

These plants must have the protection of a good garden frame or greenhouse during the winter.

They afford an agreeable variety from the silvery appearance of their leaves.

COPAIFERA, a genus containing a plant of the exotic balsamiferous kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Leguminosæ*.

The characters are: that there is no calyx: the corolla has four petals, oblong, acute, concave, very spreading: the stamens consist of ten filiform filaments, incurved, a little longer than the corolla: anthers oblong, incumbent: the pistillum is a round, compressed-flat, pedicelled germ: style filiform, incurvate, length of the stamens: stigma obtuse: the pericarpium is an ovate, bivalve legume, pointed with part of the style: the seed single, ovate, involved by a berried aril.

The species is *C. officinalis*, Balsam of Capevi Tree.

In its native situation it is a lofty elegant tree, with a handsome head: the extreme branches at the axils are flexuose, and have a smoothish bark of a brownish ash colour. The leaves are alternate, pinnate, the midrib or rachis round, and four inches long: leaflets three or four pairs, without an odd one, lanceolate-ovate, ending in a blunt point, quite entire, shining, subcoriaceous, with several obliquely-ascending veins, the middle nerve prominent beneath, and ferruginous; they are from two to three inches long, and on short petioles; the inner ones are narrower by half than the others; the two uppermost opposite, but one of these frequently wanting, so that the leaf then appears to be unequally pinnate; the rest are alternate. The flowers are white, sitting closely on the peduncles. It is a native of South America.

It is the tree which affords, by perforating the trunk, the fluid balsam or resin which thickens by degrees, and is entitled "Balsam of Capevi."

Culture.—It may be increased by sowing the seeds procured from America, or the West Indies, on a bark hot-bed; and when the plants are of a proper size, they should be potted and placed in the bark-bed of the stove, and treated as other plants of the exotic woody kind. It may likewise be raised from cuttings of the young shoots planted in the spring season in pots, plunging them into the hot-bed.

These plants afford variety, in assemblage with others of the same sort.

CORDIA, a genus comprising a plant of the flowering shrubby exotic kind, for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliæ*.

The characters are: that the calyx is a one-leaved, tubular perianthium, toothed at the top, permanent: the corolla one-petaled, funnel-form: tube patulous, length of the calyx: border erect-spreading, cut into five (four or six) obtuse divisions: the stamina have five filaments, subulate: anthers oblong, length of the tube: the pistillum is a roundish germ, acuminate: style simple, length of the stamens, bifid at top; divisions bifid: stigmas obtuse: the pericarpium is a globose drupe, acuminate, growing to the calyx: seed, a nut furrowed, four-celled.

The species mostly cultivated is *C. Sebestena*, Sebesten, or Rough-leaved Cordia.

It has several shrubby stems, eight or nine feet high, having towards the top rough alternate leaves on short petioles, of a deep green on their upper side. The flowers terminating in large clusters upon branching peduncles, sustaining one, two, or three flowers. The corolla is large, with a long tube, spreading open at top, and there divided into five obtuse segments; it is of a beautiful scarlet colour, making a fine appearance. A small piece of the wood thrown on a pan of lighted coals, perfumes the whole house with a most agreeable smell. It is a native of both the Indies.

It is from the juice of the leaves, combined with that of the fruit of a species of fig, that the fine red colour with which they dye their cloths in Otaheite is prepared.

Culture.—It is raised by sowing seed obtained from the West Indies, as soon as possible after they arrive, in pots of light earth, plunging them in a common hot-bed or bark-bed; and when the plants have two or three months' growth, they should be pricked out singly in small pots, replunging them in the hot-bed, to forward their rooting afresh; being afterwards continued constantly in the stove or hot-house. They require frequent watering in the summer.

Plants of this sort are very ornamental in stove-collections.

COREOPSIS, a genus containing plants of the flowering herbaceous perennial kind. Tick-seeded Sun-flower.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositæ oppositifoliæ*.

The characters are: that the calyx is common, either simple, subimbricate, or doubled: the ex-

terior usually with eight leaflets, which are coarse, and placed in a circle; the interior with as many larger ones, membranaceous and coloured: the corolla compound rayed: corollets hermaphrodite, numerous in the disk: females eight in the ray: proper, of the hermaphrodite tubular, five-toothed: female ligulate, four-toothed, spreading, large: the stamina in the hermaphrodites, filaments five, capillary, very short: anther cylindrical, tubular: the pistillum in the hermaphrodites: germ compressed: style filiform, length of the stamens: stigma bifid, acute, slender: in the females, germ like the hermaphrodites: style and stigma none: there is no pericarpium: calyx scarce altered: the seed in the hermaphrodite solitary, orbiculate, convex on one side, concave on the other, with a transverse protuberance at top and bottom, surrounded by a membranaceous edge, with a two-horned tip: in the females none: the receptacle chaffy.

The species cultivated are: 1. *C. verticillata*, Whole-leaved Coreopsis, or Tick-seed Sun-flower; 2. *C. tripteris*, Three-leaved Coreopsis; 3. *C. alternifolia*, Alternate-leaved Coreopsis; 4. *C. lanceolata*, Spear-leaved Coreopsis.

The first has a perennial root, with many tall, stiff, angular stems, upwards of three feet high. The leaves are opposite, often in whorls; leaflets very narrow and entire; the branches opposite; the peduncles long, slender, and one-flowered; the ray yellow; and the disk dark purple. It continues long in flower in the latter end of the summer; and is a native of North America.

The second species has likewise a perennial root; the stems strong, round, smooth, six or seven feet high: the flowers in bunches at the top of the stem, on long peduncles; ray of the corolla pale yellow; disk dark purple. It is a native of North America.

The third has a woody perennial root: the stems several, annual, erect, angular, filled with white pith, winged, from five to ten feet high, simple, having only very short subdivisions at the top into roundish villose peduncles: the leaves are rugged on both sides, of a dirty green colour; the lower ones three or four together, or two opposite, the rest alternate, decurrent. The flowers are large, of a yellowish colour, coming out late. It is a native of Virginia.

The fourth species has several stems, decumbent at bottom, and thence arising obliquely, a foot and a half or two feet in length. At each joint a pair of oblong leaves, with other smaller ones. The peduncles are round and smooth. The florets in the ray eight or nine, broad, with four deep large teeth at the end. It is a native of Carolina, and lasts two or three years.

Culture.—The propagation of these plants is easily effected, either by slipping or dividing the roots in autumn, when the stalks decay, planting them out where they are to remain, keeping them clean from weeds, and cutting down the stalks annually in autumn, when they begin to decay. The third and fourth sorts may be rendered more forward by the use of a hot-bed. They are all well calculated for the more large borders and clumps, introducing them in the vacant spaces between shrubs; as they exhibit a plentiful bloom till late in the autumn.

CORIANDRUM, a genus containing a plant of the herbaceous culinary annual kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatae*.

The characters are: that the calyx is an universal umbel, with few rays: partial with very many: involucre universal scarce one-leaved: partial three-leaved, halved, linear: the perianth proper five-toothed, standing out: the corolla universal difform, rayed: floscules of the disk abortive: proper of the disk hermaphrodite: petals five, inflex-emarginate, equal: proper of the ray, hermaphrodite: petals five, inflex-hearted, unequal, of which the exterior is very large, two-parted; but the nearest lateral ones have a very large division: the stamina have five simple filaments: anthers roundish: the pistillum is an inferior germ: styles two, distant: stigmas of the ray headed: there is no pericarpium: fruit spherical bipartite: the seeds two, hemispheric and concave.

The species cultivated is *C. sativum*, Common or Great Coriander.

It has an annual small root; the stem a foot or a foot and half in height, smooth and branched: the root-leaves larger, doubly pinnate: pinnules broad, gashed on every side, serrate and even half-two-lobed: upper leaves very finely divided, also doubly pinnate: the pinnules linear, slender, divided into two or three segments: petals white, or reddish. It flowers in June and July; and the seeds ripen in July and August.

The leaves have a strong disagreeable scent; but the seeds are grateful to the taste, and, when incruusted with sugar, sold by the confectioners. They, as well as the plant, are also sometimes used for culinary purposes.

Culture.—This is managed by sowing the seed in the spring, or beginning of summer, in shallow drills, half an inch deep, and six inches asunder, keeping them afterwards free from weeds. As the plants soon run up to seed, five or six sowings should be made, from March till the latter end of summer, the last on a warm border, or in a bed to be defended with a frame, &c., in order

to provide young green leaves more conveniently, as they may be wanted in winter.

When cultivated for seed, it should be sown early in March, either in drills a foot apart, or broad-cast, and raked in: when the plants are an inch or two in height, they should be hoed to six or eight inches distance. They produce ripe seed about August; when the seed-stems should be carefully pulled or cut in proper time: as the seeds are but slightly attached, if particular care is not taken in gathering soon enough, and cutting the stalks, a great part sheds and is lost. When cut, they should be put into a cloth, and thrashed out as soon as possible. The young leaves are used as culinary herbs, and the seeds for different purposes.

It is a proper plant for shrubby borders, and clumps, to increase the variety, where its creeping roots send up many small suckers for future increase.

CORIARIA, a genus comprising a plant of the deciduous flowering hardy shrubby kind.

It belongs to the class and order *Dioecia Decandria*.

The characters are: that in the male the calyx is a five-leaved perianth, very short: leaflets subovate, concave: the corolla has five petals, very like the calyx, connected: the stamina consist of ten filaments, length of the corolla: anthers oblong, two-parted: in the female, the calyx is a five-leaved perianth very short; leaflets subovate, concave: the corolla has five petals, cuspidate, calyciform, converging: the stamina consist of ten filaments (five within the calyx; five within the petals) very short: anthers barren: the pistillum has five germs, compressed, inwardly conjoined: styles as many, bristle-form, long: stigmas simple: there is no pericarpium: five fleshy, ovate-lanceolate, three-sided petals, with one of the angles looking inwards, covering the seeds: the seeds five, kidney-form.

The species mostly cultivated is *C. myrtifolia*, Tanner's or Myrtle-leaved Sumach.

It is a shrub which seldom grows more than three or four feet high. It creeps at the root, and sends forth many stems. In the male plant, the flower-buds are often in pairs from the scar of the fallen leaves. Male aments, cylindric, opposite, in pairs (one from each bud), leafless: pairs from one to five, below the polygamous aments: the flowers are separated by fleshy, concave scales: the hermaphrodite buds also solitary or in pairs, above the former, in several pairs; some males being mixed with the hermaphrodites. The other buds, occupying the ends of the branches, have male flowers only, in leafless aments.

In the female plant, very many flower-buds are placed along the branches, opposite by pairs:

aments long, peduncled, more leafy, having from one to four leaves, the outmost gradually larger: the raceme looser, few-flowered; the scales separating; the flowers narrower and more acuminate.

It is a native of the South of France, &c. flowering from May to August. It is used in tanning leather, and in dyeing black.

Culture.—This is a plant easily increased by suckers taken from the root, which it affords plentifully, and which may be taken off with fibres to them in the autumn or winter. It may likewise be raised from layers made in autumn, and taken off in the following autumn, being then planted out where they are to remain.

CORK TREE. See *QUERCUS*.

CORNELIAN CHERRY. See *CORNUS*.

CORNUS, a genus comprehending plants of the hardy deciduous shrubby kinds.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Stellatæ*.

The characters are: that the calyx is an involucre generally four-leaved, many-flowered: leaflets ovate, the opposite ones smaller, coloured, deciduous: perianth very small, four-toothed, superior, deciduous: the corolla has four petals, oblong, acute, flat, smaller than the involucre: the stamina consist of four subulate filaments, erect, longer than the corolla: anthers roundish, incumbent: the pistillum is a roundish inferior germ: style filiform, length of the corolla: stigma obtuse: the pericarpium is a roundish drupe, umbilicated: the seed is a heart-shaped, or oblong, two-celled nut.

The species cultivated are: 1. *C. sanguinea*, Common Dog-wood: 2. *C. florida*, Great-flowered Dog-wood: 3. *C. alba*, White-berried Dog-wood: 4. *C. sericea*, Blue-berried Dog-wood: 5. *C. mascula*, Cornelian Cherry.

The first rises to the height of from four or five to eight or ten feet: the leaves are opposite, quite entire, but sometimes with the edge waving, strongly nerved, slightly pubescent on both sides, two inches and a half long, one and a half broad: petioles smooth, furrowed above, and four lines in length: the peduncles axillary, leafless; pedicels short and very close together: forming a five-cleft cyme, again subdividing: some of the flowers are female, and the fruit round, obscurely umbilicate, very dark purple: the pulp soft and bitter. It is a native of Europe; flowers in June, the berries ripen in August.

The second species seldom rises above seven or eight feet high, but is generally well furnished with large leaves: the branches are terminated by large white flowers, having a very large involucre, being succeeded by clusters of dark red berries. It flowers in April and May, but not

very plentifully here: it is however very hardy, and known in the nurseries by the title of Virginia Dog-wood.

There is a variety with a rose-coloured involucre.

The third species has much resemblance to the first; differing only in its recurved branches and white berries: the stem is woody, putting out many lateral branches near the ground, so that, unless it is trained while young, it generally spreads low: the branches during summer are brownish, but in winter change to a fine red: the flowers are produced in large cymes at the extremity of every shoot, towards the end of May, and are white: the fruit also becomes finally white: these shrubs produce fruit the best when planted in stiff ground. It is a native of North America.

The fourth is a shrub which grows two fathoms in height, with an upright, round, branched, gray stem: the branches are opposite, round, spreading, dusky purple: shoots round, with a ring at the joints, almost without spots, and dark red, as in the first, the younger ones more or less pubescent: the leaves acuminate, entire, nerved: they are narrower, and deeper veined than in the third: the flowers grow in smaller cymes: the fruit is smaller, and of a deep blue colour when ripe: the shoots are of a beautiful red colour in winter; and in summer, from the leaves being large, of a whitish colour on their under side, and the bunches of white flowers at the extremity of every branch, it becomes a valuable shrub; and in autumn, when the large branches of blue berries are ripe, it makes a fine appearance. It is a native of North America.

The fifth species, in its wild state, is a shrub, four or five feet in height; but when cultivated it advances into a tree twenty feet high. The shoots are ash-coloured and pubescent: the leaves are in pairs, ovate-lanceolate, subhirsute: the flowers come out very early in the spring, before the leaves: the leaflets of the involucre are lanceolate, often reflected and permanent: the peduncles are one-flowered, somewhat villose, from twelve or fifteen to thirty in an umbel: the fruit is oblong, and of a high shining scarlet colour, the size and form of a small Olive Acorn. It is a native of France, &c., flowering in mild seasons early in February.

Culture.—These plants may be raised either by seeds, layers, or cuttings. In the first method, the seed of the American kinds should be sown as soon as possible in spring, in a bed of good earth, half an inch deep; but they may be sown in autumn probably with more advantage.

The Cornelian Cherry, and common Dogwood, and all those sorts that ripen seeds in this climate,

should be sown in the autumn; and they will for the most part rise the succeeding spring.

When the plants are a year old, they should be planted out in nursery-rows; and when they are from two to four or five feet high, they are proper for being removed into the shrubbery, clumps, and other places.

In the second mode, the shoots of the year should be laid down in autumn; and they will be well rooted, and fit to remove the following autumn.

Cuttings of the strong shoots of the same year, ten or twelve inches long, should be planted three parts in the ground in the autumn, and in the autumn following, when well rooted, removed and planted out as above. Suckers from the roots planted in the same way also make good shrubs.

All these shrubby trees are proper for large shrubberies, wilderness-works, and other ornamented grounds, where they effect a fine variety by their leaves and numerous flowery umbels in summer, as well as their clusters of berries in autumn; and in the Dog-wood kinds, by their beautiful red shoots in winter, when their leaves are fallen. They all succeed in any common soil and exposure, and require no culture, but to permit them to assume their natural growth; only just cutting off any rambling side shoots, and clearing away suckers from the roots, and the dead wood from the branches or other parts.

CORNUTIA, a genus containing a plant of the shrubby kind for the stove.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Personatae*.

The characters are: that the calyx is a one-leaved, roundish perianth; very small, tubular, five-toothed, permanent: the corolla is one-petalled, ringent; tube cylindric, much longer than the calyx: border four-cleft, upper division erect, roundish; lateral ones distant; lower roundish, entire: the stamina have four filaments, of which two project beyond the tube of the corolla: anthers simple, inclining: the pistillum is a roundish germ: style very long, two-parted: stigmas thickish: the pericarpium is a globose berry, at the base comprehended by the calyx: the seed single, kidney-form: calyx five-toothed: stamina longer than the corolla: style very long: the berry one-seeded.

The species mostly cultivated is *C. pyramidalis*, Hoary-leaved Cornutia.

In its native situation it rises to the height of ten or twelve feet: the branches are four-cornered, and grow straggling: the leaves are opposite, ovate, hoary, on very short petioles, acuminate, deciduous: the petiole in falling is broken off a line distant from the branch, and

remains a hard, truncate, blunt, perennial process, supporting the branches that come out from the axils: the flowers are in corymbs at the ends of the branches; of a fine blue colour, usually appearing in autumn, and sometimes remaining in beauty two months, or longer. It is a native of America.

Culture.—It is propagated either by seeds or cuttings. In the first mode the seeds should be sown in the spring, in pots of light earth, and, when the plants are of sufficient growth, removed into separate pots, replunging them in the bark-bed of the stove, where they are to remain.

The cuttings should be planted in pots of light earth, at the same season, and managed afterwards in the same manner as the above.

These plants afford variety in assemblage with other stove exotics.

CORONILLA, a genus comprising plants of the evergreen and deciduous shrubby kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceae*.

The characters are: that the calyx is a simple umbellule: perianth one-leaved, very short, compressed, bifid, erect; the three inferior teeth smaller; the two superior conjoined; permanent: the corolla papilionaceous: standard heart-shaped, reflected on all sides, scarce longer than the wings: wings ovate, converging at top, gaping at bottom, obtuse: keel compressed, acuminate, ascending, usually shorter than the wings: the stamina consist of diadelphous filaments (single and nine-cleft), ascending at almost a right angle, the tips widish; anthers simple, small: the pistillum is a columnar, oblong germ: style bristled, ascending: stigma small, obtuse: the pericarpium is a legume, very long, columnar, straight, contracted with an isthmus between each seed; two-valved, one-celled, parting by joints: the seeds many.

The species are: 1. *C. juncea*, Linear-leaved Coronilla; 2. *C. Valentina*, Small Shrubby Coronilla; 3. *C. argentea*, Silvery-leaved Coronilla; 4. *C. glauca*, Great Shrubby Coronilla; 5. *C. Emerus*, Scorpion Sena.

The first rises from two to four feet high, with many slender woody branches, as in broom: the leaves are linear, spear-shaped, small, and somewhat fleshy: the flowers stand upon pretty long axillary peduncles, in small bunches, are of a bright yellow colour, and appear for six or seven months together, but have not produced seeds in this climate. It is a native of the South of France.

The second species rises three or four feet high: the leaflets nine or eleven, oblong-cordate or wedge-form retuse, with a small point or

none, glaucous, somewhat fleshy, having the colour of rue in the early spring: the flowers are on long axillary peduncles in close bunches, small and deep yellow. It has a strong odour, and is a native of Spain.

The third is a very humble shrub, rarely growing more than two feet high, when planted in a good soil; but in a dry barren place, not much above one foot: the stem is hard and woody, from which the branches are produced on every side near the ground, so as to form a low bushy shrub. At the joints where the leaves are produced are two ear-shaped stipules. The flowers are on long slender axillary peduncles, yellow, and have a strong sweet scent: it produces plenty of flowers in May, making a fine appearance; the seeds ripening in August. Its silvery colour is said to be occasioned by its growing on a poor dry soil. It is a native of the island of Crete.

The fourth species seldom grows more than three or four feet high, with a woody branching stem: the leaflets five or seven, glaucous, wedge-form, seldom obcordate, with a small reflex point: the flowers bright yellow, in a roundish bunch: they are remarkably fragrant during the day. It is a native of the South of France.

The fifth rises from two to six feet in height (eight or nine in gardens): the stem not very straight, branched and brachiate (so weak as sometimes to want support): the leaflets three or four pairs, gradually larger, almost cordate, glaucous and smooth: the peduncles umbelled, with from three to five yellow flowers. Miller kept this species under its old name of *Emerus*, dividing it into greater and less; the former being common in gardens, but the latter in very few. It is a native of France, flowering in April.

Culture.—As the first four sorts, and especially the second, are rather tender, though they will succeed in the open air in mild winters, they should in common be potted, to be moved to the shelter of a green-house, or glass frame, or some place in a sheltered situation in the full ground. The last sorts are hardy and elegant flowering-shrubs, for the clumps and other parts of extensive pleasure-grounds.

The four first kinds may be increased by seeds sown in the spring, either on a warm border, or in a slender hot-bed; but the latter is the best mode, as it produces them more forward, in pots of rich earth half an inch in depth, plunging them in a hot-bed when necessary. When the plants are two or three inches in height, they should be pricked out in separate small pots, giving shade, water, and air, hardening them gradually to the full air, about the middle of summer, in which they may remain till autumn, then removing them to the shelter of a frame

during winter, covering them only in time of frost, or very severe weather.

The last sort, or Scorpion Sena, may be raised plentifully both by seeds, layers, and cuttings; the seeds being sown in March, in a bed of light earth, and covered half an inch deep, giving occasional waterings in dry weather. When the plants have had one or two years' growth, they should be removed into nursery rows, and in two or three more they will be large enough for planting in the shrubbery, or other places. The layers of the young shoots may be laid down in autumn or winter, giving them a gentle twist. When they are perfectly rooted, they should be taken off, and planted out as above. The cuttings of the young shoots should be planted in the spring, or autumn, in shady borders, giving water the following spring and summer. When well rooted they should be removed, as in the above methods.

CORTUSA, a genus containing a plant of the low flowering herbaceous biennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Preciae*.

The characters are: that the calyx is a five-lobed perianth, spreading, very small, perianth: divisions lanceolate, three-toothed: the corolla one-petalled, wheel-shaped: tube scarce any: border flat, five-parted, ample; divisions ovate, acute; throat with an elevated ring: the stamina consist of five obtuse filaments; anthers two-plated, oblong, erect, affixed to the outward part: the pistillum is an ovate germ: style filiform, longer than the corolla: stigma almost headed: the pericarpium is an oval capsule, acuminate, half-five-valved: the seeds numerous, compressed, cornered: the receptacle is columnar and free.

The species cultivated is *C. Matthioli*; Bear's Ear Samole of Matthioli.

It sends out many oblong smooth leaves, a little indented on the edges, and forming a sort of head like the auricula. The peduncles come out in the centre of the leaves, rise about four inches high, and support an umbel of flowers, each on a slender short pedicel; they are of a flesh colour, and spread open like those of the auricula. It is a native of the Alps, &c. flowering in April and May; being, according to some, biennial.

Culture.—These are plants which require some trouble in preserving in the garden, as they stand in need of shade and a poor sandy soil, as well as frequent waterings.

They are increased by parting the roots in the beginning of autumn, in the same manner as is practised for the auricula.

These are low ornamental plants.

CORYLUS, a genus comprising plants of the hardy deciduous shrubby-tree kind. The Hazel or Nut Tree.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that the male flowers are disposed in a long ament: the calyx is an ament common imbricated on every side, cylindric, permanent: the scales one-flowered, narrower at the base, wider at the top, and more obtuse, inflex, three-cleft; middle division equal in length to the others, but as wide again, and covering the others: there is no corolla: the stamina consist of eight filaments (six or eight), very short, growing to the interior side of the calycine scale; anthers ovate-oblong, shorter than the calyx, erect; female flowers remote from the males, on a very small subglobular ament, in the same plant, sessile, included within the bud: the calyx is a two-leaved perianth (one-leaved), leathery, lacerated on the margin, erect, length of the fruit; during the time of floescence scarcely visible, on account of its smallness: there is no corolla: the pistillum is a roundish germ, very small: styles two, setaceous, much longer than the calyx, coloured; stigmas simple: there is no pericarpium: the seed is an ovate nut, scalped as it were at the base, but little compressed at the tip, slightly pointed.

The species cultivated are: 1. *C. avellana*, Common Hazel-nut Tree; 2. *C. rostrata*, American Cuckold-nut Tree; 3. *C. Colurna*, Constantinople or Byzantine Hazel-nut Tree.

The first is properly a shrub: the stem is covered with a whitish cloven bark, which is smooth on the branches, frequently of a bay colour, and spotted with white; on the shoots it is sometimes smooth, sometimes hairy, ash-coloured and green, with white tubercles: the leaves are alternate, gash-serrate, wrinkled, with hairs on both sides standing out, dark green above, bright green beneath, on very hairy round petioles, half an inch in length. The male catkins appear in autumn, and wait for the expansion of the female germs in the spring: the styles are of a bright red colour, long and setaceous: the flowering branches, especially those which bear the fertile flowers, are set with short fine hairs terminating in globules: the catkins are in pairs of a yellowish green colour.

There are several varieties and sub-varieties of this plant, as, with white-skinned kernels, with red-skinned kernels; great cob-nut with large round fruit; cluster-nut with the fruit in clusters at the ends of the branches; long nut, which is rounded and broadish at top; Barcelona or Spanish nut, which is large, roundish, and well kernelled; the filbert, which has the tree more

erect than the common hazel, and of which there are white-skinned and red-skinned sub-varieties.

The second species has an upright stem dividing into a branchy head: the leaves are oblong, heart shaped and acute, the length of the calyx-being such as to cover the nut entirely even after it is ripe, and rostrated. It is a native of Virginia.

The third has the stem upright and shrubby, branching to the height of four or five feet: the leaves are a little lacinated at top: the raceme of nuts very large: the nuts roundish, and in shape like those of the common hazel, but more than twice their size: the cups or involucre very large, so as almost to cover the nut, and deeply cut at the brim. It is a native of Constantinople.

Culture.—All these different sorts may be easily increased, either by planting the nuts, layers, suckers of the roots, grafting, or budding; but the second is the best and most safe method for continuing the sorts.

In the first mode the nuts should, after being preserved in an airy shed or cellar, in sand, be planted in drills in the spring to the depth of about two inches, and a foot apart. When they have had a twelvemonth's growth, they should be removed into nursery rows, at the distance of two or three feet, and a foot apart in the rows, training them according to the purpose for which they are wanted, as standard trees, half-standards or dwarfs, for one or two years, when they will be proper for removing into the situations where they are to remain.

For the first purpose, they should be trained with a single stem five or six feet high, at which height they should be suffered to branch out and form a head, according to their natural growth; but for half-standards, a three or four feet stem is sufficient; and for dwarfs, they should be trained with a single stem to a foot and a half or two feet in height, then topped, that they may branch out, and form a low spreading head.

This mode cannot, however, be fully depended on for producing the same sorts with certainty.

In the second mode, some of the lowest young branches, which have plenty of young shoots, should be laid down in the autumn or winter season; and when they have become perfectly rooted, they may be taken off and planted out in nursery rows at the distance of two feet, and twelve inches apart in the rows; the plants being trained as above.

When large supplies are wanted, the best way is, however, to form stools, by heading down a few trees, nearly to the surface of the ground, the preceding year; as by this means abundance

of shoots may be provided. In this way, and by suckers, grafting, and budding, the sorts and varieties may be preserved with certainty.

The suckers arising from the roots of trees raised in either of these methods, when taken up in autumn, winter, or early spring, with good radical fibres, grow freely and form good plants, which should be planted at once where they are to remain when large, and the smaller sizes in nursery rows, till of proper growth.

This mode of raising the plants is chiefly adopted in Kent, where large quantities are cultivated.

The grafting and budding of these trees may be performed on stocks of any of the kinds during the early spring months. See **GRAFTING** and **BUDDING**.

The kinds most deserving of cultivation are the Cluster Large Cob, Barcelona, and the two varieties of Filbert Nuts; which may be planted after having been trained in any of the above modes.

The filbert sorts, which are in the most common culture, may be planted as standards in rows, ten, fifteen, or twenty feet distance, by twelve feet in the lines, and trained to single stems to four, five, or six feet in height, and with branchy, full spreading heads; or in the hedge manner, either in single rows, to run up in their natural growth, or in a double row, ten or twelve feet between, to form shady filbert walks, in all of which modes they bear abundantly; but the detached single standards commonly produce the largest and finest nuts.

It is observed in the *Annals of Agriculture*, that in Kent, where this sort of fruit is much grown, the trees are never suffered to rise above six feet in height, and are regularly pruned like gooseberry bushes. They are planted at the distance of twelve feet, and, when full spread, the heads are formed by the branches six feet in diameter. The inter-spaces are cultivated with hoeing crops, the vigour of the trees depending much on the stirring of the ground. The soil on which they succeed best is a strong loam, on which they bear greatly; the fruit being large and fine, and not maggoty.

They are sometimes planted to form a kind of hedge, setting them at five feet distance, and leaving them to nature, to shoot from the bottom, sides, and tops, in their own manner; but in this way they do not, in general, produce such large, fine fruit, as trees with one stem, standing at such distances that their heads have full scope to spread out regularly in different directions.

Where full plantations of these trees are wanted, they should be planted in rows, at not less than fifteen or twenty feet distance, or less than ten or fifteen feet asunder in the rows.

All the culture such trees require, after being planted out where they are to remain, is to clear the bottoms annually from suckers arising from the roots, and the stems from all side shoots; the heads being mostly suffered to take their natural growth, except just retrenching the rambling shoots or branches.

Some of the other species may be planted with much advantage and effect in the borders, clumps, and other parts of ornamented grounds, where there is sufficient room.

CORYPHA, a genus containing plants of the perennial exotic kind. Fan Palm.

It belongs to *Appendix Palmæ*, and ranks in the natural order of *Palms*.

The characters are: that the calyx is a spathe universal compound: spadix branching: the corolla three-parted: petals ovate, obtuse, spreading: the stamina have six filaments, subulate, longer than the corolla: anthers caudate: the pistillum is a roundish germ: style subulate, short: stigma simple: the pericarpium is a globose berry, large, one-celled: the seed single, bony, large, globose.

The species are: 1. *C. umbraculifera*, Great Fan Palm; 2. *C. minor*, Smaller Fan Palm.

The first, in its native situation, is described as growing to a large tree: the leaves pinnate-palmate, very large and broad, and, when dried, folding up in the manner of a fan: they grow quite on the top of the tree: it scarcely flowers before it is of thirty or forty years growth, when it produces numerous beautiful yellow blossoms in great spreading branches, succeeded by much fruit. It is a native of Malabar.

The second has a spreading root, sending up frondose foot-stalks, with large palmate-fan-shaped, plaited leaves, from eighteen inches to two feet long, and near eighteen inches broad, opening like a fan, and putting forth between the leaves a spathe protruding a spadix of flowers, which are succeeded by a smooth, black, sweet fruit, the size of a pea. It is a native of India.

Culture.—These plants may be increased, either by seeds, or slips from the crowns of the roots: the seeds, should be procured from abroad, and sown in pots of sandy light earth, plunging them in a hot-bed, and giving occasional waterings; and in the autumn or spring following, the plants will be fit to be removed into separate pots. The off-sets slipped from the crowns of the roots should be separated with fibres to them, planted in pots in the spring, being plunged in a hot-bed.

They require to be kept constantly in the stove, and to have the management of other exotic plants of similar growth.

COTYLEDON, a genus affording plants of the succulent perennial hardy kind, for the greenhouse and stove.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-leaved, five-cleft perianth, acute very small: the corolla is a five-cleft bell-shaped petal: nectary consisting of a concave scale, seated at the exterior base of each germ: the stamina consist of ten filaments, subulate, straight, the length of the corolla: anthers erect, four-furrowed: the pistillum has five germs, oblong, thickish, ending in subulate styles, which are longer than the stamens: stigmas simple: the pericarpium consists of five capsules, oblong, bellied, acuminate, one-valved; gaping longitudinally inwards: the seeds very many and small.

The species are: 1. *C. orbiculata*, Round-leaved Navelwort; 2. *C. spuria*, Narrow-leaved Navelwort; 3. *C. hemispherical*, Knife-leaved Navelwort; 4. *C. Laciniata*, Cut-leaved Navelwort.

The first rises with a short thick succulent perennial stalk, which rarely exceeds a foot in height, branching out on every side, so as to spread over the pots in which it is planted. The branches become woody by age, and are closely beset by thick round leaves of a grayish colour, with purple borders, plane on their upper side, convex on the under, and very fleshy; of an herbaceous colour within, and full of moisture. There are clusters of pale yellow flowers at the ends of the branches. It is a native of the Cape; flowering from July to the beginning of autumn.

The second species has a short greenish succulent stalk, seldom more than a span high, dividing into several irregular branches: the leaves thick, succulent, four inches long, half an inch broad, and as much in thickness, having a broad concave furrow on their upper side, and convex on the under; bright green, with a purple tip: the peduncles terminating, near a foot high: the flowers on short pedicels, yellow: tubes long, brims reflex, tipped with purple.

The third has a thick succulent stalk, rarely more than a span high, dividing into many branches: the leaves are short, thick, succulent, not more than half an inch long, and a quarter of an inch broad, grayish, with green spots, sessile: the peduncles terminating, six inches long, naked, supporting five or six flowers, alternate, sessile, greenish, with purple tips.

The fourth has the stem upright, about a foot high, jointed and succulent: the leaves broad, deeply cut on their edges, of a grayish colour, opposite almost embracing: peduncles terminating, about six inches long, sustaining seven or eight small flowers of a deep yellow colour. It is a native of Egypt, &c. flowering in July and August.

Culture.—All these sorts are easily increased by cuttings of their young succulent branches

planted out in the spring or summer months, after being exposed for a week or ten days to heal over the cut parts, in pots of dry sand or compost; placing them either in the green-house, or a frame, to have shelter from wet, and occasional shade; but it is of great advantage to plunge them in a bark-bed, or other hot-bed, in forwarding their striking roots, giving occasional shade, and water once a week: they should be hardened to the full air during the summer months.

They afford ornament and variety among other green-house plants.

COVENTRY BELLS. See CAMPANULA.

CRAMBE, a genus affording plants of the esculent and shrubby exotic kinds.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siligosæ*.

The characters are: that the calyx is a four-leaved perianth: leaflets ovate, channelled, somewhat spreading, deciduous: the corolla four-petalled, cruciform: petals large, obtuse, broad, spreading: claws erect-spreading, length of the calyx: the stamina have six filaments, two the length of the calyx, four longer, with a two-cleft tip: anthers simple, on the exterior branch of the filaments: a melliferous gland between the corolla and the longer stamens on each side: the pistillum is an oblong germ: style none: stigma thickish: the pericarpium is a dry berry, globose, one-celled, deciduous: the seed single and roundish.

The species are: 1. *C. maritima*, Sea Cabbage, or Colewort; 2. *C. fruticosa*, Shrubby Sea Cabbage, or Colewort; 3. *C. strigosa*, Rough-leaved Shrubby Sea Colewort.

The first has roots creeping under ground, by which it propagates fast: the whole plant is smooth: the lower leaves are petioled, very large, and spreading on the ground, variously waved, jagged and indented; smooth, glaucous, sometimes tinged with purple: many stalks arise among these, two feet high, spreading and much branched bearing similar but sessile leaves: the flowers on long peduncles, white. It is a native of the beachy coasts of Sweden, &c.

The second species is a stiff shrub, with leafy branches: leaves alternate, petioled, deeply toothed, pinnatifid, or pinnate, with the divisions serrate; hoary: the branchlets terminate in a large, diffused panicle, with alternate, divaricate, racemed branchlets; the racemes short. It is a native of Madeira; flowering most part of the year.

The third is a rugged shrub: the stem erect, round, loosely branched, ash-coloured, the height of a man: the leaves alternate, oblong ovate, either undivided or eared, obliquely subcordate acuminate, unequally toothed, wrinkled, nerved, bright green on both sides, spreading, reclined, and four times as large as those of the second:

petioles round on one side, channelled on the other, strigose: panicles terminating, very long, composed of alternate compound racemes, peduncled, divaricate: flowers pedicelled, erect and white. It is a native of the Canary Islands; flowering in May and June.

Culture.—The most proper soil for raising the first sort, is that of the sandy or gravelly kind. The usual method of cultivating it is, by sowing the seed in drills upon raised beds, about four feet and a half wide, with alleys of two feet between them, either in the autumn or spring. The ground should be prepared, by digging it well over to the depth of two feet, and reducing it well in the operation. It should then be formed into beds of the above breadth, and three shallow drills be made length-ways by a line on each; the seeds being thinly scattered in, and covered to the depth of about an inch, and the whole raked even. As soon as the plants are up, they should be thinned out, by removing the weakest to the distance of eight or ten inches, and kept perfectly free from weeds, by occasional hoeing in the summer season. In the beginning of the following autumn, the decayed stems should be cleared away, and light earth from the alleys be laid over the beds, to the depth of two or three inches. The following spring and summer, the plants should be kept clear from weeds, and earthed up in the autumn to the depth of three or four inches with light sandy earth. In the second spring, some of the roots are often in a state to be cut; but it is the best practice to repeat the same management in the autumn, and let them remain till the third spring, when they will be large, and in full perfection.

The author of the "Philosophy of Gardening," on the authority of a friend, has suggested another method of raising and blanching crops of this sort, which is by sowing the seed about the beginning of April in drills, the plants being earthed up and kept clean from weeds. In the beginning of autumn, the roots of the plants should be removed into high beds, one row of them being planted on each, at the distance of about a foot, being well earthed up in the winter. The driest ground should be chosen for this purpose. It is not in a state to be eaten till the third year after being sown. The year before cutting, it is directed to be "covered up in the beginning of winter, first with stable dung, kept from pressing on it, by a few sticks placed like a cone over each root, then with long litter, two or three feet high, the higher the better, as the more it is forced the earlier it is fit to be gathered, and the whiter it will be." In this culture, it may be begun to be gathered about the beginning of January, and continued till May, one bed being kept under another.

Beds planted in either of these methods will continue for a great number of years, producing crops annually, care being taken to keep the plants clean from weeds, and in the former well earthed up in the autumn, to blanch the roots, stirring the surface a little with a fork in the spring, and raking the surface even.

In this mode of culture, some also advise the beds to be covered in winter with dry rotted dung, to promote the growth of the plants, as well as protect them from frost, removing the more coarse part as the spring approaches, in order to loosen the surface, and render it even.

In gathering the shoots, the earth should be opened, and the shoots cut some inches below the surface.

The author of *Phytologia* remarks, that this is an excellent vegetable at an early season, when boiled, and served up as asparagus; and that the young heads, without being blanched, are "equal, or superior to most kinds of brocoli."

When cultivated for the purpose of ornament, the seeds should be sown where the plants are intended to remain in the early spring months; or on beds, in order to be transplanted in the autumn.

The two last species may be increased by planting cuttings of the young shoots in the spring, or summer season, in pots filled with light sandy earth, watering them sparingly, and giving them the protection of the greenhouse in winter.

They are very ornamental among collections of this sort of plants.

CRASSULA, a genus containing plants of the succulent kind for the greenhouse and stove. Lesser Orpine, or Live-Ever.

It belongs to the class and order *Pentandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-leaved perianth, five-cleft; divisions lanceolate, channelled-concave, erect, acute, converging into a tube, permanent: the corolla has five petals, claws long, linear, straight, converging, connected at the base with the ovate bractes at the border, reflex-expanding: nectaries five; each with a very small emarginate scale, annexed outwardly to the base of the germ: the stamens consist of five subulate filaments, length of the tube, inserted in the claws of the corolla: anthers simple: the pistillum has five germs, oblong, acuminate, ending in subulate styles the length of the stamens: stigmas obtuse: the pericarpium consists of five capsules, oblong, acuminate, straight, compressed, gaping inwards lengthwise: the seeds many and small.

The species are: 1. *C. coccinea*, Scarlet-flowered Crassula; 2. *C. perfoliata*, Perfoliate Shrubby



Painted by Wm. Edwards

London Published June 1. 1860 by G. Kearsley Fleet Street

Engraved by F. W. Woodman

1 *Crataegus coccinea*
Scarlet flowered Crataegus.

2 *Cytisus Laburnum*
Laburnum

Digitized by Google

Crassula; 3. *C. cultrata*, Sharp-leaved Crassula; 4. *C. punctata*, Dotted-leaved Crassula; 5. *C. nudicaulis*, Naked-stalked Crassula; 6. *C. orbicularis*, Starry Crassula.

There are several other species that may be cultivated.

The first has a reddish jointed stem, about three feet high, dividing at top into many irregular branches: the leaves so closely opposite, as to appear to be in four rows: the flowers at the ends of the branches in close umbels, of a fine scarlet colour. It flowers in July and the following month.

The second species rises with an upright stem ten or twelve feet high, if it be not broken or injured, but requires support; the stems being slender, and the leaves very weighty: the latter are about three inches long, thick, succulent, pale green, acute, hollowed above, and having a convex ridge beneath: the flowers terminating in large clusters, of a whitish herbaceous colour, with short tubes, and the brim cut into five parts. The flower-stalk is thick and succulent, generally turning first downwards, then upwards again, somewhat in the form of a syphon. It flowers in July, but does not produce seeds in this climate.

The third has a weak succulent stalk, about two feet high, sending out many irregular branches: the leaves thick, plane above, convex beneath, deep green, the borders set with a few silvery hairs: the stalk which supports the flowers rises from the top of the branches, and is from four to six inches long, putting out several side branches, which grow erect; these are terminated by large clusters of small greenish flowers, which appear in June and the following month, but the flower never fully expands.

In the fourth species, the stems are very slender, full of joints, and trailing: the leaves thick, succulent, heart-shaped, connate, grayish, in a double row, hollow dotted: the stems are divided, grow about eight or nine inches long, and are terminated by clusters of small white flowers, sitting very close to the top: these appear in spring, and again in the latter part of summer.

The fifth never rises with a stalk, but the leaves come out close to the ground, forming a sort of head; they are smooth, somewhat hairy, set with excavated dots, succulent, taper, ending in points, and frequently put out roots. Out of the centre of these arises the flower-stalk, branching into two or three shoots at top, each terminated by clusters of greenish flowers, which do not open. It flowers in May, and sometimes again towards the latter part of summer.

The sixth species is a low perennial plant,

having open spreading heads, very like those of some sorts of Houseleek, growing on the ends of very slender trailing stalks, produced in plenty on every side the parent plant, as on the Chidding Marigold. The flower-stalks arise from the centre of these heads; are naked, about four inches long, and terminated by close clusters of herbaceous flowers: the leaves are radical, forming roses, ovate, fleshy, gibbous, even, sharpish, ciliate backwards, with cartilaginous, very slender hairs: the root puts forth lateral threads, which are filiform and decumbent, forming runners at the end. It flowers sometimes in May, but usually in July and August.

Culture.—The first three sorts may be easily increased, by planting the cuttings of the stems and branches in the later spring and summer months, after having been exposed in a dry situation for a few days, to heal over the cut parts, in pots filled with sandy earth, plunging them in the bark-bed of the stove, or in a frame shaded from the sun. When well rooted, they should be removed into separate pots, and replaced in the same situations till fully established, when they may be removed into the greenhouse, where they should have a sunny situation in winter, and but little water.

The other species may be increased by planting the off-sets from the roots in the same manner as above.

As these are plants of a succulent nature, both in their stems, branches, and leaves, as well as of curious growth, they afford variety among collections of other plants of similar kinds. They are capable of bearing the open air in summer, in dry warm situations.

CRATÆGUS, a genus affording plants of the hardy deciduous tree and shrub kinds. Hawthorn and Wild Service Tree.

It belongs to the class and order *Icosandria Digynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved perianth, concave-spreading, five-cleft, permanent: the corolla has five roundish petals, concave, sessile, inserted into the calyx: the stamina consist of twenty subulate filaments, inserted into the calyx: anthers roundish: the pistillum is an inferior germ: styles two, filiform, erect: stigmas headed: the pericarpium is a fleshy, roundish berry, umbilicated: the seeds two, somewhat oblong, distinct, and cartilaginous.

The species cultivated are: 1. *C. oxyacantha*, Hawthorn or Whitethorn; 2. *C. aria*, White Beam, or White-leaf Tree; 3. *C. torminalis*, Wild Service, Sorb, or Maple-leaved Service; 4. *C. coccinea*, Great American Hawthorn; 5. *C. viridis*, Green-leaved Virginian Hawthorn; 6. *C. Crus Galli*, Cockspur Hawthorn; 7. *C. tomen-*

rosa, Woolly-leaved Hawthorn; 8. *C. Azarulus*, Parsley-leaved Hawthorn, or Azarole.

The first rises with an ascending, round trunk, very much branched: the bark is smooth: at the base of each petiole are two semiorbicular stipules, deeply toothed, acuminate at top: thorns sharp (coming out from between the stipules): the leaves are trifid, petioled, decurrent, sharp at the base, shining, the middle segment trifid, very entire about the edge (commonly in the upper floral leaves, but serrate in the branch leaves): the peduncles are branched, with two or three flowers on each division, of a white colour, succeeded by bunches of dark red berries. It flowers in May.

There are varieties, with large, oblong, smooth, bright scarlet fruit, with buds appearing of a fine yellow, and the fruit of a golden colour, being retained all the winter, with white berries, with double blossoms in large bunches. The Maple-leaved, at first of a pure white, then turning to a faint red, and the Glastonbury or Early-flowering Thorn.

The second species is a tree, which rises to the height of thirty or forty feet, with a large trunk, dividing into many branches; the young shoots have a brown bark, covered with a mealy down: the leaves are between two and three inches long, and one inch and a half broad in the middle, of a light green on their upper side, but very white on their under, with many prominent transverse veins running from the midrib to the border, where they are unequally serrate: the flowers are produced at the ends of the branches in large corymbs or bunches, of a white colour, much branched. It is a native of most parts of Europe, flowering in May.

There are varieties, with deeply sinuated pinnatifid leaves, as the Swedish, and with leaves not white underneath.

The third rises to the height of forty or fifty feet, with a large trunk, spreading at the top into many branches, so as to form a large head. The young branches are covered with a purplish bark, marked with white spots: the leaves are alternate, on pretty long foot-stalks, cut into many acute angles, like those of the Maple-tree; near four inches long, and three broad in the middle, having several smaller indentures towards the top; of a bright green on their upper side, but a little woolly on the under: the flowers produced in large bunches towards the end of the branches; white, and shaped like those of the Pear-tree, but smaller, and on longer peduncles; appearing in May, being succeeded by roundish compressed fruit, like common Haws, but larger; ripening in autumn, when they are of a brown colour, and if kept till soft

have an agreeable acid taste. It is a native of Denmark, &c.

There is a variety, with oblong, ovate, slightly serrate leaves on short foot-stalks.

The fourth species rises to the height of near twenty feet, with a large upright trunk, dividing into many strong, irregular, smooth branches, so as to form a large head: the leaves are large, bending backwards; about four inches long, and three and a half broad, with five or six pairs of strong nerves, becoming of a brownish red in autumn: the flowers come out from the side of the branches in large clusters; are large, making a noble show in May, and are succeeded by large pear-shaped fruit of a bright scarlet colour, which ripens in the beginning of autumn. It is a native of Virginia, &c.

The fifth has a thornless stem and branches, with lanceolate, oval, serrated, smooth leaves, green on both sides: it is supposed by Martyn to be probably a variety of the foregoing.

The sixth species has a strong stem, ten or twelve feet high; the bark of the stem rough, of the branches smooth and reddish: the leaves are lanceolate, three inches long, and one inch broad in the middle, serrate, of a lucid green, and alternate: at many of the joints are smaller leaves in clusters: thorns axillary, very strong, two inches in length: flowers axillary, in roundish clusters, generally two together: petals white, with a blush of red; and the fruit globular, of a fine red colour. It flowers in June, and is a native of North America.

The seventh species has a slender shrubby stem, about six or seven feet high, sending out many irregular branches, armed with long slender thorns: the flowers are small, proceeding from the side of the branches, sometimes single, and at other times two or three upon the same peduncle, having large leafy calyxes, succeeded by small roundish fruit. The flowers appear in the beginning of June, and the fruit ripens late in the autumnal season. It is a native of North America.

There is a variety usually known by the title of Carolina Hawthorn, which has longer and whiter leaves, and larger flowers and fruit, but no thorns.

The eighth species has a strong stem, twenty feet high, with many strong irregular branches, covered with a light-coloured bark; the leaves somewhat like those of common Hawthorn, but much larger, with broader lobes, and of a paler colour: the flowers come out in small clusters from the side of the branches, and are in shape like those of the common Hawthorn, but much larger, as well as the fruit, which, when fully ripe, has an agreeable acid taste. It is a native of the South of Europe, &c.

Culture.—All the sorts are capable of being increased with facility, by sowing the seeds in the open ground, either in the autumn or spring, in drills or broadcast, covering them to the depth of about an inch. The seeds may be gathered from the hedges in many of the sorts, and the others be procured from the nurserymen, being employed when fully ripened. The plants mostly appear in about twelve months. They should be kept perfectly clean from weeds, and be occasionally watered when the weather is hot and dry. When they have had one or two years growth in the seed-beds, they may in most of the sorts be removed into nursery-rows, and set out at the distances of from eight inches to two feet, according to the sorts, and from six inches to a foot in the rows; to remain till wanted for the purpose of forming hedges, or planting out in other places, having the top shoots and other parts cut and pruned, as there may be occasion.

The more curious sorts are generally proper for the purpose of planting out, when they have attained three, four, or five feet growth.

In order to continue the varieties, recourse must be had to the practice of budding, grafting, or layering the young branches. The two first may be performed upon stocks of the common Hawthorn, as any of the sorts will take upon that sort of stock, or upon those of one another; but the former mode is the best. The operations should be performed at the usual season in the manner directed. See **Budding** and **Grafting**.

The young shoots should be laid down in the autumn, and when they have stricken good roots, which in most cases happens in twelve or eighteen months, be taken off, and planted out in nursery rows, or other places, as the above.

The cuttings of the young shoots planted in the spring in rather moist situations, will sometimes take root, and become good plants.

All the sorts are hardy, and capable of succeeding in almost any soil or situation.

The first is a highly useful plant for the purpose of forming hedges.

And all the other species and varieties may be employed as ornamental plants in the clumps and other parts of extensive shrubberies, and other plantations. Many of the sorts have likewise a very ornamental effect, when planted out singly on lawns, or other similar parts of pleasure grounds, especially when in flower, from their beautiful blossom. On this account they have also a fine effect in mixed plantations.

CRATEVA, a genus containing plants of the tree exotic kind for the stove.

It belongs to the class and order *Dodecandria*

Monoecia, and ranks in the natural order of *Putamineæ*.

The characters are: that the calyx is a one-leaved perianth, four-cleft, deciduous, flat at the base: divisions spreading, ovate, unequal: the corolla has four oblong petals, bent down to the same side: claws slender, length of the calyx, inserted into the divisions: the stamina consist of sixteen or more bristle-form filaments, declining to the side opposite to the petals, shorter than the corolla: anthers erect, oblong: the pistillum is a germ on a very long filiform pedicel, ovate: style none: stigma sessile, headed: the pericarpium is a fleshy, globose berry, very large, pedicelled, one-celled, two-valved? the seeds many, roundish, emarginate, and nestling.

The species cultivated are: 1. *C. tapia*, Smooth Crateva, or Garlic-Pear. 2. *C. marmelos*, Prickly Crateva.

The first is a tree which has a very large trunk, that in its natural situation rises to the height of thirty feet or more, covered with a dark green bark, sending out many branches, forming a large head. The branches are garnished with trifoliate leaves, standing on pretty long foot-stalks; the middle leaf, which is much larger than either of the others, is oval, about five inches long, and about two and a half broad in the middle. The two side leaves are oblique, the sides joining, the middle leaf being much narrower than the other, turning at both ends towards the middle, their midrib not being parallel to the sides; these two end in acute points. They are all smooth, of a light green on the upper side, but pale on the under, with entire edges. The flowers are produced at the ends of the branches, standing upon long peduncles: the fruit is about the size of an Orange, having a hard brown shell, inclosing a mealy pulp. It has a strong smell of Garlic; and is a native of the West Indies.

The second grows to a great height, with a large trunk, sending out many long branches, garnished with trifoliate leaves; the leaflets are oblong, entire, and end in acute points; between these, the branches are armed with long sharp thorns, which come out by pairs, and spread asunder: the flowers are produced in small clusters from the side of the branches, five or seven standing upon a common branching peduncle; these have each five acute petals, which are reflex; they are green on the outside, whitish within, and have a grateful odour. After the flower, the germen swells to the size of an Orange, having a hard shell, which incloses a fleshy viscous pulp, of a yellowish colour, which has an agreeable flavour when ripe. It is a native of India.

Culture.—These plants may be increased by sowing the seeds obtained from the places of their native growth, as soon as they are procured, in pots of light rich earth, plunging them in the bark-bed of the stove. When the plants have obtained about three inches growth, they should be removed into separate pots, a little water being given at the time, replunging them in the hot-bed. They require to be kept constantly in this situation, and to have the management of other plants of the tender woody exotic kind that are of similar growth.

They may be made use of for the purpose of variety among other stove plants.

CREPIS, a genus comprising plants of the herbaceous ornamental annual kind. Bastard Hawk-weed.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Semiflosculosæ*.

The characters are : that the calyx is common double : exterior, very short, spreading, deciduous : interior ovate, simple, furrowed, permanent : scales linear, converging : the corolla is compound imbricate, uniform : corollets hermaphrodite, very many, equal : proper one-petalled ; ligulate, linear, truncate, five-toothed : the stamens consist of five capillary filaments, very short : anther cylindric, tubular : the pistillum a somewhat ovate germ : style filiform, length of the stamens : stigmas two, reflex : there is no pericarpium : calyx roundish : the seed solitary, oblong, fusiform, sometimes columnar : down hairy, generally stipitate : the receptacle naked, with cells or pits.

The species cultivated are : 1. *C. barbata*, Spanish Bearded Crepis, or Purple-eyed Succory Hawk-weed ; 2. *C. rubra*, Purple Crepis.

The first is an annual plant, putting out leaves next the root, nine inches in length, and almost two broad in the middle, of a light green colour : the stems are a foot and half high, dividing into many branches, having leaves of the same form with the others, but smaller and sessile : the flowers are produced at the ends of the branches, and of a yellow colour, with a purplish base. It flowers in June ; and is a native of the South of Europe.

There are varieties, with deep yellow flowers, and with sulphur-coloured flowers inclining to white, each having a dark purple base.

The second species has also an annual root ; the root-leaves many, lanceolate, and deeply jagged. From these the stalks arise, which are a foot and half high, dividing into many slender branches, each terminated by one large flower of a red colour. It is a native of Italy.

Culture.—These, like other annuals of the

hardy kind, must be raised by sowing the seeds in either the autumn or spring ; or at both periods, where they are required to flower for a great length of time, in patches, in the clumps, borders, or other parts, where they are to remain, six or seven in each, covering them in lightly. When the plants have attained six or seven inches in growth, they should be thinned out to three or four in each patch, and be kept free from weeds.

They succeed in most soils and situations, having a pleasing effect in their flowers, in the fronts and other parts of the borders and clumps of ornamented grounds.

CRESCENTIA, a genus comprehending a plant of the exotic tree kind. Calabash-Tree.

It belongs to the class and order *Didymia Angiospermia*, and ranks in the natural order of *Putamineæ*.

The characters are : that the calyx is a one-leaved perianth, two-parted, short, deciduous : divisions roundish, concave, obtuse, equal : the corolla is one-petalled, unequal : tube gibbous, crooked, torulose : border erect, five-cleft ; divisions unequal tooth-sinuated : the stamens consist of four subulate filaments, length of the corolla, spreading ; of which two are a little shorter : anthers incumbent, obtuse, twin : the pistillum is a pedicelled, ovate germ : style filiform, length of the corolla : stigma headed : the pericarpium is an oval berry, hard, one-celled : the seeds very many, sub-cordate, nestling, two-celled.

The species cultivated is : 1. *C. Cujete*, Narrow-leaved Calabash-Tree.

It is a tree that in its native situation grows to the height of about twenty feet. It divides at top into very long, thick, scarcely subdivided branches, stretching out almost horizontally, adorned with leaves disposed in bundles or tufts scatteringly at irregular distances. These are uncertain in their number from the same knot or tubercle ; oblong, attenuated at the base, on very short petioles, bright green, four or five inches long : the flower large, sometimes entirely green, but often differently variegated with purple, red, and yellow, not withering, but becoming putrid. The form of the fruit varies on different trees, being spherical, spheroidal, or shaped like a bottle ; and also in size from two inches to a foot in diameter. It is a native of Jamaica.

The Broad-leaved species may likewise be cultivated.

Culture.—This species and variety are capable of being increased by sowing the seeds, procured from the places of their native growth, as soon as they are obtained, in pots of light fresh rich earth, plunging them in a bark hot-

bed. When the plants have attained two or three inches in growth, they should be removed into separate pots of a small size, replunging them in the hot-bed. They should be kept in the hot-bed of the stove, and have the management of other tender plants of similar growth.

In this climate these plants have only a shrubby growth; but in their native situations they become large trees, producing fruit.

They are chiefly introduced for the purpose of variety among stove plants.

CRESS, GARDEN. See **LEPIDIUM**.

CRINUM, a genus affording plants of the flowery, tuberous, and bulbous-rooted perennial kinds for the stove. *Asphodel Lily*.

It belongs to the class and order of *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx has the involucre spathe-form, two-leaved, oblong, umbelliferous, after gaping reflected: the corolla one-petalled, funnel-form; tube oblong, cylindrical, inflexed: border six-parted: divisions lanceolate-linear, obtuse, concave, reflected, of which the three alternate ones are distinguished by a hooked appendicle: the stamina consist of six subulate filaments, from the base of the border, of the length of the border, converging: anthers oblong, linear, rising upwards, incurved: the pistillum is an inferior germ: style filiform, length of the flower: stigma three-cleft, very small: (simple or three-cleft:) the pericarpium is a subovate capsule, three-celled: (covered with the calyx:) the seeds several.

The species cultivated are: 1. *C. Asiaticum*, Keel-leaved Asiatic Crinum; 2. *C. Americanum*, Great American Crinum; 3. *C. erulescens*, Small American Crinum.

The first has a solid turbinate root, surrounded with long branching fibres: the stem is short, thick coated, white, single: the leaves are three feet long, three inches wide, subulate-linear, erect, striated, thick and imbricate: scapes axillary, round, equal to the leaves: the flowers are white, large, in a simple flat umbel. It is a native of Malabar.

The second species has the flowering stem a foot and half in height, the thickness of a finger, slightly compressed, coming out, not from the centre of the leaves, but on one side: the leaves are two feet and more in length, and a hand broad, furrowed on the upper surface, and keeled on the lower, smooth, stiff, light green, slightly waved on the edge, thickish, sharp-pointed, pierced with many largish pores: the flowers before they open are pale yellow, but when open of a milky whiteness, and not disagreeable in smell. It is a native of South America; flowering in July and August.

In the third the flower-stem rises immediately from the root, on the outside of the leaves, and is about two feet high; on the top are eight or ten flowers, in form of an umbel, closely joined at their base, but spreading above. They are of a beautiful white colour, and smell very sweet. After the flowers are past, the germ swells, and becomes an oblong bulb. The plants generally flower three or four times in a year, but at no regular season; as the petals are of a very tender texture, they do not continue in beauty longer than four or five days. It is a native of the Spanish West Indies.

Culture.—All these sorts are capable of being increased, by planting the off-sets of their roots, in pots filled with good fresh earth, plunging them in the bark-bed of the stove; where they should be continued until they begin to show flowers. After this they may be removed when necessary, to the shelves or other parts of the hot-house.

The roots of all the different sorts should be shifted every two years, at the period when the stems decay, in order to separate the off-sets for the purpose of increase, and to refresh the plants with fresh mould.

Their succulent stalks and beautiful flowers afford a good effect among other stove plants.

CRITHMUM, a genus affording a plant of the hardy herbaceous succulent perennial esculent kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal umbel manifold, hemispheric; partial similar: involucre universal many-leaved: leaflets lanceolate, obtuse, reflex; partial lanceolate-linear, length of the umbellule: perianth proper scarce observable: the corolla universal uniform: florets all fertile: proper petals five, ovate, inflex, equal: the stamina have five simple filaments, longer than the corolla: anthers roundish: the pistillum is an inferior germ: styles two, reflex: stigmas obtuse: there is no pericarpium: fruit oval, compressed, bipartite: the seeds two, elliptic, compressed-flat, striated on one side.

The species cultivated is *C. maritimum*, Sea or Rock Sampire.

It has a root composed of many strong fibres, which penetrate deep into the crevices of the rocks, sending up several fleshy succulent stalks, which rise about two feet high, with winged leaves, composed of three or five divisions, each of which has three or five thick, succulent leaflets, near half an inch long; the foot-stalks of the leaves embrace the stalks at their base: the flowers are produced in circular umbels at the top of the stalks; are of a yellow colour, and succeed-

ed by seeds somewhat like those of Fennel, but larger. It is used as pickle, and much esteemed for its agreeable flavour. It is a native of the rocky shores of Europe.

Culture.—This plant, from its being a native of the sea-coasts, is raised in the garden with some difficulty. In order to its successful culture, it should have a rather moist, sandy, or gravelly situation, and be duly supplied with moisture.

It may be propagated, either by sowing the seeds in the places where the plants are to remain, in the early spring months, to the depth of about half an inch, or by parting the roots, and planting them out where they are to remain, in the beginning of autumn.

When the plants have been introduced in either of these methods, they will continue for a number of years.

The leaves constitute an admirable pickle, and are sometimes used in salads, as well as for other culinary purposes.

CROCUS, a genus comprehending plants of the low-flowering ornamental bulbous-rooted perennial kind.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatie*.

The characters are: that the calyx is a one-leaved spathe: the corolla a simple, long tube: border six-parted, erect: divisions ovate-oblong, equal: the stamina consist of three subulate filaments, shorter than the corolla: anthers sagittate: the pistillum is an inferior, roundish germ: style filiform, length of the stamens: stigmas three, convolute, serrate: the pericarpium is a roundish capsule, three-lobed, three-celled, three-valved: the seeds several, and round: the corollets six-parted, equal: stigmas convolute.

The species are: 1. *C. officinalis*, Autumnal or Common Official Crocus; 2. *C. vernus*, Spring Crocus.

The first has a roundish bulbous root, as large as a small Nutmeg, a little compressed at the bottom, and covered with a coarse, brown, netted skin; from the bottom of the bulb many long fibres are sent out, which strike pretty deep into the ground; the flowers come out at the upper part of the root, which, with the young leaves, whose tops just appear, are closely wrapped about by a thin spathe or sheath, which parts within the ground, and opens on one side: the tube of the flower is very long, arising immediately from the bulb, without any foot-stalk, and at the top is divided into six ovate obtuse segments, which are equal, and of a purple blue colour. In the bottom of the tube is situated a roundish germ, supporting a slender style, which

is not more than half the length of the petal, crowned with three oblong golden stigmas, spreading asunder each way, which is the Saffron. It flowers in October, and the leaves continue growing all winter; but it never produces seeds in this climate. It is supposed by Martyn to be a native of Asia.

The chief varieties are: the Sweet-smelling with a smaller, and more compressed root, having a deep blue colour, but varying to a sky-blue: the Mountain, which has a flower of a paler blue colour; the Many-flowering blueish, with numerous sky-blue flowers; and the Small-flowering, having a small deep blue flower.

The second species has a pretty large compressed bulb, covered with a light brown, netted skin, from which arise four or five leaves of a purplish colour on their lower parts: from among these come out one or two flowers, sitting close between the young leaves, never rising above two inches high, and having an agreeable odour. From the centre of the tube a slender style proceeds, which is crowned by a broad flat stigma of a golden colour. After the flower is past, the germ pushes out of the ground. In the wild state, it is most commonly white, with a purple base. It is a native of Italy, &c.

The chief varieties are: the broad-leaved purple variegated, which has a flower of a deep blue colour, and striped; the broad-leaved plain purple; the broad-leaved violet-coloured, or large deep blue; the white with a purple bottom; the broad-leaved white variegated; the broad-leaved with many violet-purple flowers striped with white; the broad-leaved ash-coloured; the broad-leaved large yellow; the broad-leaved small pale yellow; the broad-leaved small yellow striped with black; the narrow-leaved small brimstone; and the narrow-leaved small white.

In modern catalogues, many other varieties of different colours are introduced, as blue and purple, yellow and white, or striped. New ones are also continually imported from Holland. The usual varieties at present in gardens are: the beautifully striped Scotch; the blue; the blue striped; the white; the yellow of several shades, larger and smaller; the yellow striped with black; the cloth of gold, &c.

Culture.—The culture in both these sorts is easily effected, by planting the bulbs or off-sets taken from the roots; the first sort in July, or the beginning of the following month, and the latter any time when the weather is open, from September to the beginning of April in the following year; but the more early it is performed, the stronger they flower; by means of a dibble or trowel, to the depth of about two inches,

the ground being previously well dug over, and left some time to settle. They may be set either in beds by themselves in rows, at the distance of eight or nine inches, and six or eight inches apart, or in patches of five or six roots in each, on the fronts of the clumps, borders, or other parts of gardens and pleasure grounds, putting them in in a varied manner, both in respect to the sorts, and the order in which they are planted.

Where the soils are tolerably dry, they may remain two or three years without being disturbed, but should then be taken up at the time the leaves decay, in order to separate the new bulbs or off-sets for further increase, as well as to new dig the ground. The larger bulbs should be separated from the small ones, and put up, each by themselves, in order to be planted at the proper season; the former in the above manner, and the latter in beds in rows six inches distant, to remain till they are of a proper size. See **BULBOUS ROOTS**.

As the bulbs increase fast, a large stock may with care soon be provided. But when this is not practised, bulbs of the different species and varieties may easily be procured from the nursery and seeds-men.

In the culture of these plants, great injury is frequently done by trimming off the green leaves at the time the flowers decline, in order to prevent litter; as by such means the future blow is rendered more weak and less beautiful.

Where new varieties are wanted, recourse must be had to the seed, which must be sown in the spring season, either where the plants are to remain, in a bed of light mellow earth, or in pots filled with the same sort of earth.

The first species is the plant which is cultivated in fields, and from the stigma of which the preparation known under the title of English Saffron is made.

CROTALARIA, a genus affording plants of the herbaceous and shrubby exotic kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a three-parted perianth, large, rather shorter than the corolla: the two superior divisions lanceolate, leaning on the standard; the third lanceolate, concave, supporting the keel, three-cleft: the corolla papilionaceous: standard cordate, acute, large, depressed on the sides: wings ovate, shorter by half than the standard: keel acuminate, length of the wings: the stamina consist of ten filaments, connate, rising, with a split line on the back, and gaping base: anthers simple: the pistillum is an oblong germ, reflex, hirsute: style simple, bent inwards at an angle, rising:

stigma obtuse: the pericarpium is a short legume, turgid, one-celled, two-valved, pedicelled: the seeds one or two, globose-kidney-form.

The species cultivated are: 1. *C. juncea*, Channel-stalked *Crotalaria*; 2. *C. laburnifolia*, Laburnum-leaved *Crotalaria*.

The first rises with an angular, rushy, stiff stem, from three to near four feet in height, dividing into three or four branches: the leaves are narrow-lanceolate, alternate, closely covered with soft silvery hairs, on very short petioles: the flowers are produced at the ends of the branches, in loose spikes, being succeeded by large turgid pods, containing one row of large kidney-shaped seeds. It is a native of the East-Indies.

The second species has a shrubby stem, four or five feet high, dividing into many branches, with trifoliate leaves, having three ovate acuminate lobes of a light-green colour, about two inches long, and one broad: the flowers are large, yellow, in large bunches from the sides of the branches, appearing from July to September, and making a fine appearance.

Culture.—The first of these plants may be increased, by sowing the seeds in pots of light mellow fresh mould in the spring, plunging them in the hot-bed of the stove, and, when the plants are of sufficient growth, removing them into separate pots; and the second sort, either by seeds in the above manner, or by planting cuttings of the young branches in the later spring or summer months, in pots of the same sort of earth, and plunging them in the hot-bed of the stove, giving them water frequently, and removing them, when well rooted, into separate pots.

They may be exposed to the open air during a little of the heat of summer, but at other periods require the protection of the hot-house.

They afford variety among other exotic plants.

CROTON, a genus comprehending plants of the herbaceous shrubby sort for the stove.

It belongs to the class and order *Monoecia Monadelphua*, and ranks in the natural order of *Tricoccæ*.

The characters are: that the male flowers are smaller than the females: the calyx is a cylindric, five-toothed perianth: the corolla has in some five petals, scarce larger than the calyx, oblong, obtuse: nectary five glands, affixed to the receptacle, small: the stamina consist of ten or fifteen subulate filaments, connected at the base, length of the flower: anthers roundish, twain: female flowers remote from the males, on the same plant: the calyx is a many-leaved perianth: leaflets ovate, oblong, erect: the corolla, petals as in the males (in some scarce manifest): the pistillum is a roundish germ; styles three, reflex-spreading, length of the flower,

half-two-cleft; stigmas reflex, two-cleft; the pericarpium is a roundish capsule, three-lobed at the sides, three-celled, each of the cells being two-valved, the size of the calyx; frequently much larger: the seeds are solitary, ovate, and large.

The species cultivated are: 1. *C. lineare*, Willow-leaved Croton; 2. *C. glabellum*, Laurel-leaved Croton; 3. *C. sebiferum*, Poplar-leaved Croton, or Tallow-Tree.

The first rises with a shrubby stem, about six or seven feet high, sending out many side branches, which are covered with a smooth bark of a yellowish white colour, and very closely furnished with narrow stiff leaves, near three inches long, and about one-eighth of an inch broad, of a light green on their upper side, but their under of the same colour with the bark; the midrib is furrowed on the upper side, and very prominent on the lower: the upper part of the branches divide into four or five smaller, proceeding from the same joint, and nearly equal in length; between these arises a long loose spike of whitish green flowers. The whole plant has an aromatic odour when rubbed. From the colour of its leaves, it has acquired the name of *Wild Rosemary*, in Jamaica. It is a native of that island, &c. flowering in July.

The second species grows in a shrubby form, mostly to seven or eight feet in height. The leaves are smooth, oval, and entire: all the parts of the plant have a pretty agreeable smell. It is a native of the West-Indies.

The third rises with a shrubby stem: the leaflets are broader than they are long, and involute, and there are two glands at the base of the leaf: the leaves dye a very fine black. It is a native of China; flowering here in September. The leaves wither, turn to a dirty crimson colour, and fall off in autumn before the capsules. The young leaves shoot out again in March. Each capsule contains three hard black shells, the size of pepper-corns or common peas, covered entirely with a delicate snow-white substance. But it is not this, as is commonly supposed, that produces the tallow, but the oil expressed from the kernel; and this white substance must be well cleared from the shells before they are broken, as that considerably lessens the quantity of oil. For this purpose the shells should remain ten or fifteen days in water to soak, and then they may be cleared of the white substance by rubbing. The oil drops from the press like thick glutinous lamp oil, and soon hardens by cold to the consistence of common tallow, and by boiling it becomes as hard as bee's-wax.

Culture.—These plants may be increased by sowing the seeds procured from their native places in the early spring, in pots filled with mel-

low earth, plunging them in the bark hot-bed in the stove: when the plants are of sufficient growth, they should be removed into separate pots, and be replunged in a moderate hot-bed, having proper shade given. The first sort may likewise be easily raised, by cuttings planted in pots, and managed in the same manner.

And the second and third species may be raised by laying down the branches in the spring season, when seeds cannot be obtained.

They require the protection of the stove or hot-house during the winter season, and should be only watered very sparingly. In other respects, they should have the management of other tender stove exotics.

As they constantly retain their leaves, they afford a pretty effect in assemblage with other shrubby exotic plants.

CROWN IMPERIAL. See FRITILLARIA.

CUCKOLD TREE. See MIMOSA.

CUCKOW PINT. See ARUM.

CUCUMBER. See CUCUMIS.

CUCUMIS, a genus comprising plants of the tender trailing annual kind.

It belongs to the class and order *Monoecia Syngenesia*, and ranks in the natural order of *Cucurbitaceae*.

The characters are: that in the male flowers, the calyx is a one-leaved, bell-shaped perianth, the margin terminated by five subulate teeth: the corolla is five-parted, growing to the calyx, bell-shaped: divisions ovate, veiny-wrinkled: the stamina consist of three filaments, very short, inserted into the calyx, converging, of which two are bifid at the tip: the anthers are lines creeping upwards and downwards, outwardly adnate: receptacle three-cornered, truncated, in the centre of the flower: the female flowers on the same plant with the males: calyx perianth as in the males, the superior, deciduous: corolla as in the males: stamina none: filaments three, acuminate, very small, without anthers: the pistillum is an inferior germ, large; style cylindric, very short; stigmas three, thick, gibbous, two-parted, turned outwards: the pericarpium is a pome (herry) three-celled (or four-celled); cells membranaceous, soft, separate (into two secondary ones): the seeds numerous, ovate-acute, compressed, placed in a double order.

The species cultivated are: 1. *C. sativus*, Common Cucumber; 2. *C. Melo*, Common or Musk Melon.

The first has the roots composed of many long, slender, white fibres; the stems are also long, rather slender, and very branchy at their points, either trailing on the ground, or climbing by means of clasps. The leaves are large, angular, on long erect footstalks, having prominent

nerves on the upper surface, and being very rough with bristles. In the flowers the segments of the calyx are much longer, and the corolla of a deeper yellow than in the Melon. They are male and female on the same plant, in the same or different fruits; the latter succeeded by oblong, rough fruit.

The principal varieties are: the Common rough green prickly, six or seven inches long, with a dark green skin, closely set with small prickles, and which is hardy, a plentiful bearer, but does not fruit early. The Short green prickly, three or four inches long, with a rather smooth skin, but having small black prickles; it is one of the hardiest and earliest sorts. The Long green prickly, which is from six to eight or nine inches long, thinly set with prickles, and a good bearer: there is a sub-variety with white fruit. The Early green cluster, which is shortish, early, with the flowers in clusters. The Long smooth green Turkey, with large stalks and leaves, and the fruit generally from ten to fifteen inches long, with a smooth rind without prickles. The Long smooth white Turkey, which is less watery, and of better quality. The Large smooth green Roman, with long, large fruit, quite smooth. The Long white prickly Dutch, with fruit eight or ten inches long, white, with small black prickles, which is a bad bearer, less hardy, but the fruit not so watery, and with fewer seeds.

The second species has roots composed of numerous very stout, wide-spreading fibres; the stems procumbent or trailing to a great length, and very much branched, furnished with tendrils for climbing: the leaves are palmate-sinuate, or entire, waving about the edge, and slightly toothed, with rounded corners; rough with bristles: the flowers pale yellow, lateral, and solitary. Those termed female have four large anthers, and the germ is subglobular, and covered with white hairs. "This discovery (Martyn observes) of the flowers usually called females being real hermaphrodites with fertile anthers, as they seem to be, makes it probably less necessary to carry the males to them, as practised by some gardeners, though nature having provided male flowers, it is most likely that the pollen in the anthers of the others is frequently defective." The fruit is roundish or oval, blunt, commonly furrowed longitudinally, sometimes netted, sometimes warted or carbuncled, from four to ten or twelve inches in length and diameter, yellowish green, or white; the pulp being firm, musky, reddish, seldom green. It was first introduced into Europe from Persia.

There are numerous varieties; but those most deserving of cultivation are the Cantaleupe, so called from a place near Rome, where it has been

long cultivated. Its flesh, when in perfection, is delicious, and may be eaten with safety. The outer coat is very rough, and full of knobs and protuberances, like warts; it is of a middling size, rather round than long, and the flesh, for the most part, of an orange colour. There are several sub-varieties, such as The Large black Carbuncled, or Black Rock, which is of a blackish green-colour; Large green Carbuncled, Large white Carbuncled, and the Orange.

The Romana, which is forwarder in the season than the above.

The Succado, which is also a good sort when cultivated for early fruit, but inferior to the Cantaleupe.

The Zatte is likewise a good sort, but very small, seldom bigger than a large orange; it is a little flattened at the two ends, and the outer coat is warted like the Cantaleupe.

The small Portugal, sometimes termed the Dormer Melon, is a pretty good fruit, the plants generally producing them in plenty. It may be cultivated for an early crop.

The Black Galloway, introduced from Portugal by Lord Galloway, is likewise a good sort for early cultivation, as the fruit ripens in a very short time from its first setting.

Culture.—In the raising and producing of these fruits, much care and attention is necessary, as well as a considerable degree of skill in the regulation, management, and application of the heat which is required to bring them to perfection.

Culture in the Cucumber Kind.—The method of raising these plants is by sowing the seeds annually in hot-beds covered by frames and glasses for the early production of fruit, and in the open ground for the late crops. The former mode must, however, in general be practised in some degree or other, till the season becomes perfectly warm and settled, as towards the beginning of June. Various methods of applying heat in the producing of this fruit at early and late periods have been employed and recommended; but those which have had the greatest success are dung hot-beds, bark hot-beds, steam-pans, and flued pits. It is obvious that, in whatever manner artificial heat is made use of in this intention, the great point to be attended to is that of communicating and continuing it in as regular and equal a way as possible. But there is another circumstance which deserves consideration in the business, which is that of its being accompanied with a suitable degree of moisture. It is principally on this account that stable-dung answers more completely in the raising of this sort of fruit than tanners' bark, or the use of flued pits.

Mr. Nicol has well remarked, that the deficiency of this gentle moist heat is the reason why bark hot-beds are less useful for raising the early crops, but highly serviceable in the late ones, as they have the effect of "drying off the external damps which are then prevalent," and of course hasten the maturity of the fruit. In other cases, the plants "are impatient in a dry fire heat."

The chief objections to the employing of the steam of boiling water in the forcing of Cucumbers, are the great difficulty of keeping the heat up in a regular manner, and the vast trouble that attends it.

The principal inconveniences that have been met with in the forcing of this fruit on dung hot-beds, are the danger of injuring the plants by too much heat, and that of their being blanched by the rank steam that mostly abounds. In order to obviate these inconveniences, it has been attempted to raise these fruits on the beds of the preceding year, by means of linings of fresh dung; but, in practice, it has not only been found that such beds are equally liable to damps, but at the same time exposed to much risk and inconvenience from the frequent loss of heat in the linings.

On these accounts it is therefore probable that, until some more convenient mode of applying and keeping up a regular moist heat be discovered than has hitherto been made use of, the practice of procuring this sort of fruit on fresh made dung hot-beds must be had recourse to as the best and most certain method for the early crops.

In the cultivating of Cucumbers in this way, the principal apparatus and materials which are necessary in carrying it to any considerable extent, are a sufficient number of frames, or pits of different sizes, with glass lights for covering them, so as to prevent the entrance of water and air. And it is usual, where this culture is much attended to and practised in the most perfect manner, to have a one-light frame for the seed-bed, a two-light one for pricking out the young plants and nursing them in, and two or more two-light frames for their fruiting in; but they may be cultivated very well, on a small scale, with one or two small frames. See FORCING FRAMES.

For the constructing of the hot-beds, the principal material is fresh horse-dung in neither too long or short a condition; but proper for taking on the process of fermentation. It should be had in the proportion of about one cart-load to each light, and be prepared for the purpose by being well shaken together into a heap, ten days or a fortnight before it is made use of, as by this

means a regular heat will be brought on, and the rank heat and steam, as well as the disagreeable smell be removed. Some, in order to promote these, and render the preparation more perfect, have the whole turned over once or twice. Care, however, should be taken, that the reduction of the dung be not carried too far before it is put in the bed, as where that is the case too little heat will afterwards be produced.

Where this sort of material is scarce, and there is bark at hand, beds for the purpose may be made with it, having only dung for the outside; but care must be taken that they be so covered as that the roots of the plants never reach the bark, as it cankers and destroys them.

In the making of beds for this sort of culture, some, where proper forcing grounds are not provided, with the view of neatness, sink the foundations of them; but this should never be practised, except where the soil is very dry and gravelly, as the stagnation of moisture is very prejudicial in the bottoms of such beds. If the soil be of a moist retentive nature, it will be highly beneficial to have the bottoms raised to some height above the surface of the natural ground. Besides, where they are not sunk, the heat from above, the linings is more beneficially applied.

When proper forcing grounds are not made use of for the culture of these plants, open, dry, warm sheltered situations which decline to, or have southern aspects should be chosen.

The mould for covering the beds with should be of a light good rich quality, prepared by being thrown into a heap for several months before it is employed. Mr. Nicol advises three-fourths of the richest black loam that can be procured from a pasture, and one-fourth of vegetable mould from decayed tree-leaves, mixed and incorporated well with a due proportion of good stable-dung, as the best for this purpose. The rotten dung of old hot-beds is, however, most commonly employed with such earthy substances as the above.

The mould made use of for the more early crops should be laid up in some open place, where it may be kept in a rather dry condition, to render it more fit for the purpose.

And when it is to be made use of, it should not be rendered fine by sifting, as when made too fine it is apt to lie too close and compact, and by that means not only prevent the roots of the plants from perfectly establishing themselves, but confine the heat too much, and endanger the plants in that way.

Some small pots will be wanted where this sort of culture is attempted at an early period, both for the purpose of sowing the seed in,

and that of pricking the young plants out, that they may be removed and transplanted with greater ease and convenience, and with less danger of being injured in their growth. It is usual for each pot to contain two or three plants, which are sufficient for a one-light frame. Pots of the sizes denominated thirty-two's and forty-eight's are commonly made use of.

In addition to these requisites, bass mats are necessary to cover the glasses in the nights with, and when the weather is bad. Straw and other similar substances may be employed for the same use, but they are much less convenient.

The periods of sowing and beginning the works of forcing, in order to have this sort of fruit in the early season, must vary according as it is wanted; but for the very early crops, as those to be cut in the end of December and the following month, and in February, March, and April,—it should for the former be done towards the end of October and beginning of the following month, and for the latter in December, January, and the beginning of February. But for later crops, to come in in June and the following month, it should be in April and May. Still later crops are often produced on ridges in the open ground without artificial heat.

The general practice is, however, chiefly to have only three crops, the first in March or April, on hot-beds under glasses; the second in May and June, under hand-glasses; and the last on ridges, as mentioned before.

In order to have the crops come in regularly, an exact attention should be paid to the periods of putting in the seed and beginning the work of forcing.

In the choice of seed for the different crops, the early short and long prickly sorts are mostly made use of for the early crops, but the latter for the general ones, and those of the other larger kinds for the later crops. The seed should be taken from the earliest fruit, at the first or second joints, and be perfectly well ripened. And, in order to prevent its running too luxuriantly into vine, it should be kept two years or more before it is made use of, or, when employed while fresh, be kept some weeks or months in a dry warm situation, as by this means the plants fruit better.

Forming the Beds and raising the Plants.—In the early culture of this vegetable, it is mostly the practice, where there are sufficient conveniences and plenty of dung or other materials, to have recourse to two or more hot-beds under frames; as a small one for sowing the seeds on, and a large one for growing the plants upon; or sometimes the second is made of a more moderate size, and used for nursing the plants

in, previous to their being set or ridged out in the large one for fruiting.

But by making the beds of a good size and in a substantial manner, with due attention to linings, they may be grown very well on one or two hot-beds. When cultivated on a small scale, seldom more than one is employed.

In forming the beds, attention must be had to the size of the frames, and to making them considerably larger than the boxes. Some advise only a few inches; but Mr. Nicol thinks they should extend beyond the frames at least eighteen inches all round.

In building the beds, the dung, prepared as mentioned above, should be used in the following manner, beginning with the most littery part, and afterwards that which is more reduced. The different parts should be well mixed together, and beaten down with the fork, or trodden equally in, where very littery, once or twice as the work proceeds, till they are made up to the full height of five feet in the back and four in the front of the frame. Some suppose two feet and a half or three feet to be sufficient when the beds are merely intended for just raising the plants; but the former practice is probably always the best where plenty of materials can be easily procured. When thus prepared, it is the custom of some to let them remain with the frames and glasses upon them for a few days, that the rank heat may be brought up, and when it begins to go off to cover them over with mould prepared in the manner already described, to the depth of five or six inches, sowing the seed in little drills half an inch deep when the mould is a little warmed. Others cover them almost immediately with dry earth, tan, or other similar material, to the depth of five or six inches, sowing the seeds in small pots filled with mould, plunging them previously for a little time in the beds, cautiously guarding against too much heat at first, by drawing up the pots when necessary.

The author of the *Scotch Forcing Gardener*, however, directs, that when the beds have been made to the height mentioned above, they should be turfed over in a careful manner, as in forcing Asparagus, and the frames then placed upon them, laying dry fine sea- or pit-sand in a sloping direction, according to the frames, over the whole, to within six inches of the lights, and above that two inches in thickness of light sandy loam. The seeds should then be sown in small garden pots or pans filled with entire vegetable mould from decayed tree-leaves, and covered to the depth of half an inch, plunging them to the brims in the centres of the beds endways, and a foot from the backs. The glasses should then be placed over them.

In the course of twenty-four hours the beds will in general take on heat, when a little air should be constantly admitted, by tilting the backs of the lights an inch or more in height, and the fronts about half that height, except when there is frost, in order to discharge any rank heat or vapour that may be produced.

The frames should be carefully matted up every night when the sun begins to decline, and be uncovered again before eight o'clock in the morning, when the season will permit: as perfect a regard should be had to this, as those of air and water.

Mr. Nicol says, that "a little kindly steam in the morning is a good symptom, but it ought never to be encouraged to any great extent." He never wishes to see more steam in the beds at this time of the day, than what is entirely dispelled in the first hour after the frames are uncovered.

The bottoms of the pots or pans should be occasionally continued to be examined, to see that the heat is not too violent, raising and watering them with water brought to a proper temperature in the beds when necessary.

When the plants have attained about two inches' growth, they should be pricked out into other small pots filled with the same sort of mould, three or four in each, putting them as far distant in each as possible, the mould being settled to their roots by a little water, replunging them in the beds to their brims, the surfaces of which being previously wrought over to the full depth of the sandy covering, and another stratum of sandy loam applied as before. They should be carefully nursed in these situations, by due attention to the admission of air, the giving of water, and the regulation of steam, continuing occasionally the examination of the bottoms of the pots, to guard against too much heat being applied to the roots of the plants.

While the plants are thus carefully brought forward to the proper state for being set or ridged out in the fruiting hot-beds, which is the case when they have acquired a vigorous growth, and put forth three or four *rough* leaves, some stable-dung, in proportion to the extent of the frames, should be got ready in the manner directed above for forming the fruiting-beds, which should be made up in the same way as the former. The frames and lights should then be placed over the beds in order to bring up the heat and protect them from being injured by wet. And when the heat has become moderate, which will require time in proportion to the extent of the framing, the beds should be carthed or moulded over, the surfaces of them being previously rendered even. In per-

forming this business, the earth should be applied in such a manner as to form a sort of hillock in the middle of each light, within about a foot or eighteen inches from the backs of the frames, the whole of the other parts being covered equally to the depth of two, three, or more inches. The author of the Scotch Forcing Gardener, however, directs, that, when the dung is suspected of heating to too great a degree, the beds should be turfed all over as mentioned above; but where this is not the case, a large round turf placed in the middle of each light, exactly under the parts where the plants are to be placed, may be sufficient; the surface of the dung in this case being previously covered over to the depth of six inches with light sand or well rotted old tan, which should be first made perfectly dry.

Whichever practice is made use of, the beds will in general be in a proper state for putting the plants in, in about twenty-four hours; but before this is done the mould or earth should be drawn up, so as to raise the hillocks to within five or six inches of the glasses, exactly over the turfs, leaving them ten inches or a foot in breadth at the tops.

In the planting or ridging out the plants, a hole should be formed in each hillock, sufficiently large for the complete reception of the plants with the entire balls of earth about their roots, up to the level of the surfaces of the hills, covering them over with a little mould; the whole being then settled with a little water previously brought to the proper state of warmth, and the glasses put on.

Some, in order to promote the adhesion of the mould about the roots of the plants, have recourse to watering the pots before they are turned out.

When the plants have been thus ridged or set out, they should be carefully attended to in respect to air, water, covering in the nights and bad weather, the state of heat of the beds, linings, the occasionally moulding the spaces between the hills, and the stopping and training the plants.

In regulating the first, the state of the season and the beds should be fully considered, and air admitted accordingly, by raising the back part of the lights. The waterings should be cautiously given in the winter and early spring, but more freely as the warmth of the weather advances, shutting down the frames for some time after each application. In the more early crops much less water will be requisite than in those in which the season is more advanced, and the former will stand in need of much less frequent waterings over head than those of the latter. In these latter, shade is likewise occasionally neces-

sary when the weather is sunny. The glasses should be carefully covered up with mats every evening before the influence of the sun is wholly gone, and when the weather is very severe, more than one mat may often be found necessary. These should constantly be removed the first thing in the morning, or as soon as the sun is upon the frames, when the state of the weather will admit; but in very severe weather not removed at all.

The heat of the beds is likewise to be particularly regarded at first, by a frequent examination of the trying-sticks, and regulated in such a manner as to promote the healthy growth of the plants. When it continues too great, it should be let off by making holes in the sides of the beds, and the use of fresh earth on the surfaces.

When the heat of the beds begins obviously to decline, recourse must immediately be had to the application of linings of fresh dung round them, so as to keep up a due degree of heat, care being constantly taken to repeat them as frequently as may be necessary, and at the same time to guard against the prejudicial effects of too great heat.

These linings, Mr. Nicol advises, to be covered by turf or mould, and to have the sides and ends of the beds cut off and formed into them.

The earthing the beds between the hillocks should be gradually performed, as soon as the heat is become perfectly moderate, the mould for the purpose being previously laid in some part of the frame: Mr. Nicol considers fifteen inches as a good medium for the earth above the sand or tan, and thinks the business should be done either a few days before or after the application of the linings.

The business of pruning or stopping is by some begun while the plants are in the nursery-beds, but others defer it till after the plants are ridged out in the fruiting-beds.

Mr. Nicol does not think it at all material to pick out the heart-buds as soon as the plants have formed their rough leaves; as from the most accurate trials, and the most minute observation, he is convinced "it is of no manner of consequence, whether the buds are picked out or not." He "seldom thinks of picking or pinching till the plants begin to put forth runners or vines, nor even then, unless they happen to put forth too few to furnish their sides of the frames, till he perceives the rudiments of the fruit."

It is then, he supposes, time to stop those vines which have fruit *shown*; but the others may be suffered to run to the length of six or eight joints, and be then stopp'd, to cause them to put out

fertile ones, which they seldom fail to do when the plants are in a healthy state of growth.

Where an extraordinary quantity of male blossoms appears, it is recommended that part of them be rubbed off in a gentle manner with the finger and thumb, as the knife should never be made use of, unless in cutting out old vines; but this should never be attempted where there is not a very full blow, as it is proper to assist nature without either spurring or thwarting her.

When the female blossoms are in a state of sufficient forwardness, they may be carefully impregnated with the strongest and most healthy of the males, by which the swelling of the fruit may be greatly promoted; for though the fruit may be formed, swell to a tolerable size, and be fit for the table without, it will not ripen its seed. And though the farina of the male blossoms may often be deposited on the females by means of the wind and insects, it is the safest mode, in the early culture of these plants, to have it performed by the hand, as handsome set fruit may be set apart for seed with more certainty. In the execution of this work, which some suppose the most properly performed the day or day-after the flowers of both sorts are fully open, the best way is to gather the male blossom with a short stem, removing the petal or corolla carefully from about the stamina and antheræ, and then take the stalk of the blossom betwixt the finger and thumb, and apply the top of the stamina to the centre of the three stigmas of the female blossom, and, by giving it a slight swirl, discharge a portion of the farina into the stigmata of the female; making use of a fresh male blossom for each impregnation.

After this the plants begin to grow vigorously, and produce large quantities of fruit. Great care should therefore be taken to keep the vines in due order, and not too thick or crossing one another; all the withered and decayed leaves being removed, as well as the others when too numerous.

Air should now be admitted more freely, in increasing the proportion daily as the season advances. More large and repeated waterings should likewise be given from the rose of the pot, and the advantage of warm showers may be taken as the weather becomes more warm. Few plants require more of this fluid than these at this period of their growth. When the season becomes fine in May, the glasses may be wholly removed during the day-time. About the middle of the following month, a lining, when necessary, may be applied to the fronts of the frames in the same way as advised for the other parts,

which will continue a due degree of heat as long as it will be requisite to attend to the state of the bottom heat in the beds.

In the early culture of the Cucumber, it is a good practice never to depend for raising the plants upon the first sowing; but to continue sowing occasionally, both in the nursery and fruiting hot-beds, in pots, managing the plants in the same way as those in the seed-bed, as by this means plants of different growths will be constantly at hand, for the supplying of accidents as well as for succession crops.

Culture under Hand or other Glasses.—In this method the seed should be sown towards the latter end of March or beginning of the following month, on an old hot-bed, having the plants in a proper state for being set or ridged out about the beginning of May, which is sufficiently early for their succeeding well in this mode of culture. The most proper sort of seed for this purpose is that of the Long prickly green.

The beds for this purpose should be prepared of hot dung, in the manner directed for the early crops; being made from two to three feet in thickness, and about three in width, along the ground, in a straight line, having the distance of from three to four feet from each other. The most usual method is to form them in long trenches, or in holes a foot and half in depth; but they may be made on the level surface where this mode is attempted at an early period. In either method the beds should then be earthed over, raising the mould into little hillocks for the reception of the plants, the hand-glasses being immediately placed over them; and in the course of a day or two the earth will be in a suitable condition for receiving the plants. These should be put in in the middle of the hills, three or four in each, with balls of earth about their roots, in the same manner as practised in the other crops, a little water being given at the time and the glasses put on, proper shade being had recourse to when necessary.

Air and water should also be afforded in due proportion, according to the state of the weather and the heat of the beds, keeping the glasses well covered with mats in the nights and when the season is severe.

When the heat in these beds begins to decline, more earth should be applied between the hills of plants, and some fresh dung externally, by way of linings, to preserve and keep up the heat as much as possible when the weather continues cold. And as the warmth of the season advances, air and water should be given more freely.

When the glasses have become pretty full with

the plants, they should be raised a little, that the runners may extend themselves without, and be properly trained and pegged down, continuing to attend them carefully in respect to covering in the nights, air and water, the last being frequently applied all over the beds.

In this mode Cucumbers may be provided from about the latter end of May till the beginning of September.

Culture on Ridges in the open Ground.—For this purpose a warm sheltered situation which is open to the South, and where the soil is good and rich, should be fixed upon, the land being well dug into a trench, and a suitable proportion of dung covered in, the surface being formed into a sort of ridge or bank, sloping towards the South. Some, however, divide the ground, after being neatly dug over, into beds five or six feet in width, with alleys of a foot or foot and half between them.

In either method the seed should be put in as soon as the beds are ready; in the former, towards the back parts, and in the latter along the middle, to the depth of about half an inch, six or seven seeds in a place, an inch or two apart, slight sprinklings of water being occasionally given afterwards.

The proper season for performing these sowings is about the end of May or first part of June, according to the state of the weather.

The principal culture which is necessary during the growth of these crops, is that of keeping the vines perfectly free from all sorts of weeds, thinning the plants to proper distances, directing the runners in a regular manner along the surface, and keeping them properly watered according to the state of the season.

These crops chiefly come in about the middle of August, and are principally employed as picklers, for which purpose the beds should be carefully looked over two or three times every week, on dry days, and all such collected as are in a proper state, as about one or two inches in length, and the thickness of the finger.

When the weather proves wet, they should be guarded as much as possible from it, as under such circumstances they are very apt to become spotted.

In the saving of Cucumber seed, some of the best and most early of the general frame crops should be reserved till perfectly ripened; when they must be separated from the vine, and be laid in a proper place to dry; the seeds being then separated from the pulp, and rendered more perfectly dry, when they may be put up for use, for which they are, as has been seen, in the most proper condition after they have been kept two or three years.

The chief insect that infests crops of this sort is the aphid, which is readily destroyed by fumigating with tobacco, or in the manner advised for the Peach. See *AMYGDALUS*.

Culture in the Melon Kind.—In the raising of this sort of fruit, the same apparatus is necessary as in the culture of the Cucumber; but it is better if the frames or pits have rather more depth, and are somewhat larger in other respects.

The beds, for the early crops especially, should be prepared in the same manner, and with materials of the same kind; but the later ones may be produced in hot-beds formed of tanners' bark, either wholly, or in a great part.

Mr. Nicol thinks that they should be turfed all over in a rather stronger manner, and covered with a compost, consisting of one half of strong brown loam, a quarter light black loam, an eighth vegetable mould, and the same quantity of stable-dung.

The proper season for sowing the seed for the very early crops is about the middle of January; but the beginning of February is probably a better period; and sowings should be made twice in March for succession crops. These different sowings should be made on hot-beds, or in pots of light mould plunged in hot-beds prepared for the purpose, as in the Cucumber; or the pots may be placed in such old hot-beds of that sort as are at work, the same care and management being employed in the raising and nursing as in those of the Cucumber kind.

When the plants have attained five or six weeks' growth, or have two or three rough leaves, and are beginning to send forth runners, they are in a proper state for being planted or ridged out in the fruiting-beds, which should be prepared in the same manner as in those for the Cucumber plants: and after being well moulded over, the pots of plants put in with the full balls of earth about their roots, exactly in the same way as was practised for Cucumbers, immediately placing the glasses over them.

After this the plants should have air admitted pretty freely, and be kept in a moderate state of moisture till they begin to show fruit, great care being taken that the heat is not too great, and to keep the beds as free of steam as possible; but from that period, until the fruit is fully set and has begun to swell, the waterings should be more sparing, especially when the season is moist.

As the heat in the beds begins to decline, it should be refreshed by the application of linings, in the same manner as practised for Cucumbers; and the spaces between the hills of plants must be gradually filled up with mould to nearly the same height.

As the runners proceed in their growth, they should be trained in a regular manner; and when they have three joints' length they must be stopped. Some, however, stop them before, when they first begin to put forth runners. By these stoppings the vines are induced to throw out lateral runners which afford fruit. Mr. Nicol directs, that the vines that have fruit on them should be shortened at the second joint above it, and that such as have none should be trained regularly to the length of seven or eight joints and then stopped, to induce them to put forth new vines, which mostly show fruit at the second or third joint. It is of much importance in this state of the plants to keep up a due degree of heat, as they not only set much better and more plentifully where it is the case, but continue their growth in a more perfect manner. The young fruit mostly shows itself with numerous male blossoms: these should not be picked off as is sometimes the practice, as their farina is necessary for fecundating the female flowers, which in the early crops may be performed in the manner directed for the Cucumber. While the fruit is setting, air should always be pretty freely admitted when the weather is suitable.

When the fruit is perfectly set, water should be given in larger proportions till it has done swelling and begins to become ripe, when it should be very sparingly employed; as where given in too great abundance, the flavour of the fruit is not only much impaired, but it is often burst, and rendered less valuable.

As the Melons increase in size, pieces of slate or tile should be placed under each of them, as it not only prevents their being injured by the damp, but prevents their acquiring an earthy flavour. It is the practice with some to cover the whole surface with tiles or some straw or other similar substance, but this is not by any means judicious, as the first causes too much heat by the reflection that is produced, and the latter not only confines the moisture, but has a tendency to generate and harbour noxious insects.

In the management of the vines as the fruit approaches to the state of maturity, they should not be suffered to retain too many leaves, nor these permitted to shade it from the influence of the sun. It is necessary to look over and examine them frequently, but never to prune them too greatly at one time, as where that is done the plants are apt to sustain much injury by bleeding too much. Fresh air should be continued to be admitted freely whenever the state of the weather will allow.

This sort of fruit generally becomes ripe in

the course of six or seven weeks from the time of its setting, and should be cut as soon as ever it has obtained that state, as when delayed much of the fineness of flavour is lost. The signs of maturity are a sort of cracking at the base about the stem, having a fine yellow colour, and affording a fine fragrant smell, with a degree of softness about the top. It should be cut with a portion of the stem, and laid in a dry airy situation till wanted for use.

The author of the Scotch Forcing Gardener observes, that many of the early sown kinds are capable of "producing a second crop, equal both in quantity and quality to the first." With this intention he advises, that after the first crop has been cut, the vines be "shortened back to the last live joint on each; the beds being well watered, and protected from the effects of the mid-day sun for eight or ten days, at which time the plants will begin to push forth afresh, and show fruit in plenty."

Culture under Hand or other Glasses.—It is sometimes the practice to raise Melon crops on ridges under hand, or other sorts of glasses, especially when the season is fine.

The ridges in this case must be formed with good prepared stable-dung, in the same manner as practised in forming those for Cucumbers; and also moulded or earthed into small hillocks in the same way, only rather more earth should be employed in these cases.

The plants may be raised in the seed or other beds, and be carefully nursed in a similar method, till they are in a proper state of growth to be set out, which in this sort of culture should not be done till towards the middle or latter end of May, according to the state of the season.

The pots of plants should be set or ridged out, one on each hillock, in the same mode as those of the Cucumber kind; shade and a slight watering being given at the time, and the glasses immediately put on.

After being thus planted out, the same care and management are necessary as in the other crops, in respect to air, water, covering in the nights and bad weather, training and stopping the plants, as well as in moulding up the spaces between the hills, and the application of linings when required. When the vines begin to fill the glasses, they should be trained on the outside of them, the glasses being raised, but still left upon the plants, protecting the vine on the outside as much as possible from wet when the season is bad.

The same directions are applicable after the setting of the fruit, till it becomes in a state for cutting, as in the frame crops.

Culture in Flued Pits.—This method, as has been already remarked, is principally made use of for raising late crops of this sort of fruit.

The plants for this purpose may be raised in hot-beds, or under hand or other glasses, till they are of a suitable growth to be planted in the pits.

It is sufficiently early to commence this sort of culture about the middle or latter end of June, as at this period but little bottom heat will be wanted; the old beds that have produced other crops may be converted to this use. The Scotch Forcing Gardener directs, that one-third new be mixed with the old tan or dung in order to renew the heat, levelling the whole to the bottom of the flues quite round. Turfing is considered as unnecessary, but mould should be applied to the thickness of about fifteen inches, so as to raise the whole surface to the height of the tops of the flues.

When the beds are thus prepared, the plants should be put in, in a line along the middle of them in the pits, at the distance of about two feet from each other, care being taken to keep their roots as much as possible from reaching the tan. See BARK-PIT.

In their after-management, the plants require the same care according to the season, both in regard to air, water, training, stopping, and impregnating, as has been directed for the crops in the frames.

Towards the latter end of August or beginning of the following month, when the heat of the beds in the pits begin to be deficient, and there is much moisture and cold, it will mostly be requisite to have recourse to the aid of fire heat, in order to fully mature such fruit as is not already ripened. The fires should at first be slow, and only made in the evenings; but afterwards increased, as the severity of the season demands, so as that it may raise the heat of the air in the pits to about seventy degrees of Fahrenheit's thermometer in the evenings and mornings about eight o'clock. Mr. Nicol directs, that in order to admit air sufficiently, and keep up a proper degree of heat in dull hazy weather, a little fire should be made in the mornings; and that as the growth of the plants is now over, water should be made use of with much caution, being wholly discontinued as soon as the fruit has attained its full growth.

The seed employed in the culture of this sort of fruit should be such as is taken from the best plants of the most curious varieties, and which has been perfectly ripened, and preserved for one or more years in some dry place. New seed seldom answer well in cultivation.

The Acarus or Red Spider, is an insect that frequently does much injury to the Melon when the season is dry and there is a dry heat in the

beds. Its attacks are shown long before it becomes visible, according to Mr. Forsyth, by the "leaves curling and cracking in the middle."

As a remedy in this situation, he advises, when the weather is warm and sunny, the watering them all over the leaves from a watering-pot with the rose upon it, or an engine, about six o'clock in the morning, and about eight to shade them with mats, when the sun shines, shutting the frames down close till towards eleven, then to admit air in a small proportion, continuing the mats till about three in the afternoon, and then removing them. In this way the leaves are prevented from injury by the sun while wet. And when there is a south or south-west wind, the watering may be repeated about three in the afternoon, shutting up the frames, to produce a strong exhalation and destroy the insects. In the operation, as much water as possible should be thrown on the under side of the leaves, gently turning the vines for the purpose. The lights and sides of the boxes should likewise be well watered; and before the frames are made use of again they should be well washed inside and out, first with water, and then soap-suds and urine in a state of mixture. When Melons have been infested with the spider the preceding season, none of the earth or mould should be made use of again.

In sprinkling the leaves, water that has been several days exposed to the sun, or made soft by wood-ashes, should be employed.

The author of the Scotch Forcing Gardener, however, observes, that water at some periods cannot be thus applied without much injury to the plants, and that the leaves and vines are so brittle and tender that they cannot be brushed or touched without harm.

It is of course obvious, that much care and circumspection is necessary in extirpating these insects by the use of water.

CUCURBITA, a genus comprehending plants of the herbaceous trailing annual kind.

It belongs to the class and order *Monoecia Syngenesia*, and ranks in the natural order of *Cucurbitaceæ*.

The characters are: that in the male flowers the calyx is a one-leaved perianthium, bell-shaped, the margin terminated by five subulate teeth: the corolla five-parted, growing to the calyx, bell-shaped: divisions veiny-rugose: nectary a gland in the centre of the flower, concave, triangular: the stamina consist of three filaments, converging, connected above, distinct below, growing to the calyx: anthers creeping upwards and downwards, linear. In the female flowers the calyx a perianthium, as in the male, superior, deciduous: the corolla as in the male: nectariferous

glandule concave, spreading: the stamina, margin surrounding, ending in three very short cusps: the pistillum is a large inferior germ: style conic, three-cleft at the tip (five-cleft): stigma single, with a thick, convex margin, creeping upwards and downwards, three-cleft: the pericarpium is a pome (berry) three-celled; (three to five) cells membranaceous, soft, distinct (two-parted): the seeds very many, compressed, swollen on the margin, obtuse, placed in double order.

The species are: 1. *C. Lageneria*, Bottle or Long Gourd; 2. *C. Pepo*, Pompion, or Pompkin Gourd; 3. *C. verrucosa*, Warted Gourd; 4. *C. Melopepo*, Squash Gourd; 5. *C. Citrullus*, Water Melon.

The first has a trailing, thick, downy stalk, branching into many spreading runners, extending along the ground fifteen or twenty feet in length. The leaves are large, roundish, heart-shaped, indented, woolly, biglandulous at the base: the flowers large and white, being succeeded by long, incurved, whitish-yellow fruit, shaped like a bottle, with a large roundish belly and smooth neck, from about two to five or six feet in length, and from nine to eighteen inches or more round, having a ligneous, durable shell.

The chief varieties of which are: the Common long-fruited, the Long-protuberant-bellied, the Long sickle-shaped, the Long taper, and the Long turbinated Bottle-Gourd.

The second species has thick, angular stems, extremely hispid, branched, climbing by means of bifid tendrils, or spreading to the distance of forty feet. The leaves are cordate, large, roundish-angular, toothed, wrinkled, hairy on both sides, on long, alternate, thick, flexuose, hirsute petioles: the flowers are yellow, lateral, solitary, on peduncles resembling the petioles, but shorter: the fruit is roundish, ovate-globular, or oblong-ovate; of a pale green on the outside, and commonly hispid, with bristly hairs; within having a spongy insipid white pulp or flesh; divided in the middle into three primary cells, each of which is double, and these are subdivided into the proper cells of the seeds. It flowers from June to August.

There are several varieties, as the Common large round-fruited yellow, Oval yellow, Oblong yellow, Whitish-fruited, Stone-coloured, Flesh-coloured, Parti-coloured, Marbled, Small round, Orange-shaped, Pear-shaped, Turbinated, Hemispherical or Semi-globular, Egg-shaped, Striped roundish, Striped egg-shaped, Striped turbinated, and Striped pear-shaped Pompion, &c.

The third has trailing stalks, very branchy and spreading, running upon the ground as in the

above sort: the leaves large lobated, and the flowers yellow, succeeded by roundish, knobby-warted, white fruit, of a moderate size.

The varieties are: the Roundish Warted, the Oblong Warted, the Flat Warted, the Bottle-shaped Warted, the Orange-shaped Warted, the Lemon Warted, and the Yellow-fruited.

The fourth species has a roundish stem, hairy, procumbent or climbing, with trifid tendrils, with many long branches: the leaves are lobed-angular, serrate, hairy, alternate, on long petioles: the flowers yellow, on lateral, one-flowered peduncles: the fruit large, reddish-yellow or yellowish-white within and without, commonly roundish, often flattened at top and bottom, always torulose; sometimes ovate, but seldom warted. It is common in North America.

The varieties are: the Common broad flat, the Buckler-shaped, the Conical, Citron-shaped, the Flat-sided, the Turbinate, the Hemispherical, the Depressed, the Star-shaped, the White-striped, and the Yellow-striped Squash Gourd.

The fifth has a round striated stem, long, branched, hairy, procumbent, diffused with lateral bifid tendrils: the flowers are yellow, on short, solitary, lateral peduncles: the fruit large, smooth, round or oblong, a foot and half in length, within watery, sweet, very red or pale. It is a native of the South of Europe.

The varieties in the form of the fruit are: the Large round red-fleshed, the Large round white-fleshed, the Large oblong, and the Small round Water Melon.

Culture.—In the raising of most of these plants, as well as their after culture, the aid of artificial heat and shelter is generally requisite.

Culture in the Gourd Kind.—This is effected by sowing the seed annually, either on slight hot-beds or in the open ground in the spring months; but the former is probably the best mode, as the plants are more early. In the first method, it should be performed about the latter end of March or the middle of April; and when the plants have attained a pretty strong growth, and been hardened by the free admission of air, they should be removed into the situations where they are to remain in the open ground with balls of earth about their roots.

In the latter mode, the seed may be sown in the natural ground where the plants are to remain, about the middle of May, open sunny situations being provided for the purpose. The mould should be made fine, and the seed put in to the depth of about half an inch, three or four seeds in a place.

Some advise the putting in a little dung in the situations where the seeds are to be sown, in order to forward the plants; and when they

come up, to protect them by hand-glasses. This is particularly useful for the more tender kinds.

When the plants are of some growth, they should be thinned out to one or two good plants, and be plentifully supplied with water when the season is hot and dry, especially after they have begun to run or spread; as by this management they will extend very considerably.

When any of the sorts are cultivated for the purpose of ornament, they should be trained to strong stakes in order to show their flowers more fully.

The seed should be saved from the best and most perfectly ripened fruit of the different kinds, being carefully freed from the pulp, and preserved in a dry situation.

Culture in the Water Melon Kind.—The culture in these plants is by sowing the seed annually about the latter end of February or beginning of the following month, on pretty substantial hot-beds, keeping them protected by the glasses when the weather is bad: after the plants have attained a little growth, they should be pricked out into small pots, two plants in each, being replunged in the hot-bed. When they begin to throw out runners, they should be removed into the fruiting hot-bed in the same manner as practised for Cucumbers and Melons, only one pot of plants being employed for a two- or three-light frame, the beds being previously earthed over, and hillocks raised to the height of twelve or fifteen inches.

The after-management in regard to stopping the plants, the admission of air, the giving of water, covering the glasses in the nights, and keeping up the heat of the beds by linings, must be regulated in the same manner as for the Melon. The spaces between the hills should be gradually earthed up, and the vines be trained so as to fill the frames without crossing or being too much crowded. When they begin to show and set fruit, the heat should be well supported and kept up, that they may be so brought forward as to ripen in due time. When the fruit has attained the state of maturity, it turns rather yellow, and becomes somewhat soft at the top.

In the cultivation of all the sorts and varieties of these plants where the object is the fruit, seed that has been kept some years should constantly be employed, as new seed is apt to grow too luxuriantly.

CULINARY PLANTS, such plants as are employed in the business of cooking, as articles of food, or for the purpose of garnishing different sorts of dishes.

CUPRESSUS, a genus affording plants of

the evergreen and deciduous ornamental tree kind.

It belongs to the class and order *Monoecia Monadelphica*, and ranks in the natural order of *Coniferæ*.

The characters are: that the male flowers are disposed in an ovate ament: the calyx common ament, ovate, composed of scattered flowers; consisting of single-flowered scales, roundish, acuminate on their fore-part, peltate, opposite, about twenty in number: there is no corolla: the stamens have no filaments; the office of them is borne by the calycine scale, to which on the lower part grow four anthers: the female flowers are heaped into a roundish cone on the same plant: the calyx is a common strobile, roundish, composed of from eight to ten florets, consisting of single-flowered scales, which are opposite, ovate, convex beneath, gaping: there is no corolla: the pistillum is a germ scarcely evident: numerous points appear within each calycine scale; supposed germs without styles, each with a simple stigma; subtruncate, concave at the tip: there is no pericarpium: strobile globose, shut, gaping with orbiculate scales, which are angular and peltate beneath: the seeds several, oblong, angular, subulate, small.

The species are: 1. *C. sempervirens*, Evergreen Cypress; 2. *C. disticha*, Deciduous Cypress Tree; 3. *C. thyoides*, White Cedar, or Arbor Vitæ-leaved Cypress; 4. *C. pendula*, Portugal Cypress.

The first has an upright stem, rising to the height of fifteen or twenty feet, with many round branches, either growing upright, or spreading abroad; strigose and toothed with the rudiments of leaves: the fronds are dichotomous, subquadrangular; leaflets alternately opposite, decurrent, subcarinate, the older ones distant and mucronate, the younger closely imbricate: the fruit globular or somewhat ovate, on the sides, or at the ends of the branches; when unripe of a dark green colour. It is a native of the Levant, &c.

It has been distinguished into the upright, and horizontal or spreading kind.

The second species rises with a large erect stem or trunk to the height of fifty or sixty feet in its native situation, sending out regular branches to a great distance. The leaves are small, spreading, and deciduous, placed in a distichous manner, or along two sides of the branches.

The third grows to a considerable size in its native situation; but in this climate seldom rises much higher than fifteen feet: when raised from cuttings, it has rather the appearance of a shrub, and is not above nine or ten feet high: the branches are numerous, and stand two ways; the tree naturally forms itself into a regular head: the leaves

are evergreen, flat, sharp, very short, imbricated, and resemble those of the Arbor Vitæ, being small, and of a browner green than in the Common Cypress: the fruit is a blue cone no larger than the berry of the Juniper. It is a native of North America.

The fourth is a small tree, having a glaucous appearance, with the branches spreading irregularly, and bending downwards: the leaves are glandulose, spiral, and imbricate: the flowers like those of the first species.

In Portugal it grows to a large timber tree, but is here seldom above fifteen feet high. It grows naturally at Goa.

Culture.—These plants, in all the sorts, may be raised either from seeds or by cuttings of the young shoots; but those procured from seeds are by much the best plants.

In the first method, the seed, being provided and obtained from the cones, by exposing them to a moderate degree of heat, should be sown towards the latter end of March, or beginning of the following month, on a warm bed or border where the soil is rather light and mellow, and has been rendered fine by being well dug over, covering it in to the depth of about half an inch. When the season proves dry, slight waterings should be occasionally given, and during the summer the plants be kept free from weeds, and be watered a little when the weather is hot. In the winter time they should be protected from frosts by mats or other contrivances. They must be continued under this management till they have attained two years' growth, when they may be removed in the beginning of the spring, and planted in nursery rows in a warm situation, at the distance of eighteen inches or two feet, and eight inches or a foot apart. When they have had three or four years growth in these rows they will be in proper condition for being finally set out where they are to remain. The best time for performing this business is in the beginning of spring.

They may, however, be raised in a more expeditious manner, by sowing the seeds in pots or tubs of light earth, and plunging them in a moderate hot-bed, as in this way they will be fit for removing into nursery rows in the course of twelve months.

As seed of this sort is slow in vegetating, this last method is the most proper for it, as shade may be more conveniently provided during the summer months, and protection in a sunny exposure in the winter; and when the plants do not appear in the course of the first year, the aid of a hot-bed may be conveniently had in the following spring, by which they will be brought forward with expedition to

the state proper for being planted out in nursery-rows.

In the second mode, the cuttings made from the young shoots should be planted in a warm sheltered situation, either in the early autumn or spring months, care being taken to have them daily supplied with water in the following summer. Afterwards the plants should be managed in the same manner as those raised from seed.

This method may be attempted with all the sorts, but those of the Evergreen kind are extremely slow in striking root.

The plants raised in this way are likewise much slower in their growth than those which are produced from seed.

In their general culture, these plants should always be suffered to take their natural growth without clipping or cutting.

All these sorts, from their beautiful growth and closely-placed foliage, have a very ornamental effect in the fronts of large plantations, as well as in groups, with other trees, on the sides of lawns or other parts of pleasure-grounds. They have likewise a fine appearance in clumps, or planted out singly, and also in groups of from three or four to eight or ten of the different kinds, introduced where the extent of mown-grass ground is considerable.

The evergreen sorts, from their beautiful pyramidal growth, produce an agreeable variety, in assemblage with other sorts of plants, when planted near ornamental or other buildings.

The large tree growing sorts may likewise be introduced with great effect in the front parts of plantations of timber trees.

CUTTING, a small portion of a branch, twig, shoot, or other part of a plant cut off for the purpose of planting, with a view of increasing the kind.

There are numerous trees, shrubs, and plants which are capable of being propagated with facility in this way; and in some, the young tender shoots or branches of one or two years growth can only be employed with success; while in others, the large boughs or poles may be made use of with the greatest certainty of their growing. This is the case with most of the aquatic kind; as the willows, poplars, &c. And there are still others in which the leaves can be had recourse to, as the Agave and Aloe kinds.

In the herbaceous and succulent plants, cuttings of one or two years growth are mostly used. But in those of the tree sort, one year; and in those of the hard wooded kind, those of the same year's growth.

The proper lengths for making the cuttings are different in different sorts, according to the

nature and habits of growth of the plants, but in common, from three or four inches to a foot or foot and half; the strongest requiring in general the most length.

In the choice of shoots, branches, or other parts for this use, those of the firmest and most even growth, and the freest from lateral shoots, should be fixed upon. In most strong-shooting trees and shrubs, and all the more succulent plants, the cuttings should be taken from the lateral or terminal shoots. The cuttings in the herbaceous are usually made from the stems that support the flowers, which should be cut off from the bottoms, and afterwards divided into suitable lengths.

In some sorts, as those of the tree and shrub kinds, it is found advantageous, in some cases, to take them off with an inch or more of the former year's wood, as in the Vine, Laurel, and some others.

In the preparation of cuttings for planting, the only thing necessary is that of trimming of such side-shoots as may be present, and occasionally the crooked straggling tops in the deciduous kind; but this should not be done in the evergreen or herbaceous succulent sorts. Where the shoots are of considerable length, the lower parts should principally be employed for the purpose of cuttings.

The proper seasons for planting cuttings are according to their kinds, either the spring, summer, or autumn. The first and the last are in general the best for most sorts of trees and shrubs. Those of the herbaceous and flowering kind mostly succeed best when planted in the spring and summer months; but those of the luxuriant and more succulent sort answer best when put into the earth in the summer season.

In the planting of the cuttings of different sorts of plants, such as those of the tree, shrub, and other kinds that are not succulent, they should be put nearly two-thirds of their lengths into the ground: but those of the succulent sort should only be put lightly into the soil, so as just to support them in their proper position, as when put in too deep they are apt to rot, or do not take root so readily. The cuttings of most of the tree, shrub, and plant kinds should be put into the soil as soon as possible after they are made; but those of the succulent tribe are better to remain out of the earth till the cut parts be fully incrustated or healed over, as when put in while the moisture is oozing out, they are apt to rot and be destroyed. In all the sorts the mould should be well pressed about them, and in the former kinds be kept properly cool by watering. It is also of great use to keep them perfectly steady in the earth.



Painted by Ed. Edwards

London. Published Feb 1 1836 by G. Kearsley, Fleet Street

Engraved by E. Fryer

Cyclamen persicum
1 Persian Cyclamen

Crocus vernus
2 Spring Crocus

In the management of cuttings after being planted out, some succeed perfectly in the open ground, others in sheltered shady situations; some require to be placed in pots, for the convenience of occasional protection in severe weather, and others to be plunged in hot-beds in order to promote their striking root, as is fully explained under the Culture of each particular sort.

The length of time which is necessary for striking root is different in the different sorts. In many of the tree, and some of the herbaceous, shrubby, and succulent kinds, it will be perfectly effected in the course of one or two months; and in almost all the sorts in the course of a twelvemonth. When assisted by artificial heat, it is always effected in a more expeditious manner than where the contrary is the case.

In this method of propagation, the varieties of all the different curious species which are capable of being increased in this way, may be equally preserved and kept distinct, as in the practices of budding, grafting, and layering.

CYCLAMEN, a genus containing plants of the low, herbaceous, flowery, perennial tuberous-rooted kind. Snow-Bread.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Precie*.

The characters are: that the calyx is a half-five-cleft perianthium, roundish, permanent: divisions ovate: the corolla one-petalled: tube somewhat globose, twice as large as the calyx, small, nodding: border bent upwards, five-parted, very large: divisions lanceolate: neck prominent: the stamina consist of five very small filaments in the tube of the corolla: anthers straight, sharp, in the neck of the corolla, converging: the pistillum is a roundish germ: style filiform, straight, longer than the stamens: stigma sharp: the pericarpium is a globose berry, one-celled, gaping five ways at the top, covered with a capsular shell: the seeds very many, somewhat ovate, cornered: the receptacle ovate and free.

The species cultivated are: 1. *C. Europæum*, Common Cyclamen; 2. *C. Com.*, Round-leaved Cyclamen; 3. *C. Persicum*, Persian Cyclamen; 4. *C. hederæfolium*, Ivy-leaved Cyclamen.

The first has a tuberous root, oblately spheroidal, white within, brown without; from which proceeds, within the ground, a very short stem, and from that the leaves and one-flowered peduncles or scapes: the leaves are kidney-form, roundish, very blunt, slightly crenulate, deep green, and spotted above; beneath commonly red purple, smooth, on very long round red petioles: the flowers drooping, sweet-scented, and purple. It is a native of Austria.

The second species has a round, solid, tuberous root, and low naked stem, furnished with plane orbicular leaves, and short weak petioles; the under side of the leaves very red in the beginning of winter, but that colour goes off in the spring; the upper side smooth, of a lucid green, spreading flat open: the flowers are very bright purple, appearing in the middle of winter. It is a native of the South of Europe.

There are varieties with purplish flowers, and with flesh-coloured flowers.

In the third, the leaves are stiff, on strong fleshy petioles, near six inches long, of a purple colour, as are also the veins of the leaves underneath; but the upper side is veined and marbled with white: the corolla is pure white, with a bright purple bottom. It flowers in March and April, and the seeds ripen in August.

There are varieties with entire white sweet-scented flowers, and with veined and marbled leaves, with pale purple flowers, and bright red or purple bottoms.

The fourth has a large, orbicular, compressed root: the leaves are numerous on petioles six or seven inches long, marked with black in the middle: the flowers appear before them on long fleshy scapes about August; soon after which the leaves come out, continue growing all the winter and spring till May, when they begin to decay. After the flowers are fallen, the peduncles twist up like a screw, inclosing the germ in the centre, and lie close to the ground among the leaves, which serve as a protection to the seed, which ripens in June. It is a native of Italy.

There are varieties with white and with purplish flowers.

Culture.—These plants are all capable of being increased by sowing the seeds in large wide pots, tubs, or boxes, filled with good light mould, mixed with a little sand, in the latter end of summer or beginning of autumn, covering them to the depth of about half an inch, exposing them at first in situations that have only the morning sun, but afterwards removing them into more warm and sunny exposures; and as the winter approaches, placing them under the protection of frames and glasses, or some other contrivance, fresh air being freely admitted when the weather is mild and suitable. In this way some plants of the hardy sorts will appear about the beginning of the following year, and of all the kinds in the spring. During the beginning of summer, when the weather is hot and dry, slight waterings should be given occasionally; but when their leaves begin to decline in the latter end, they should be removed to an eastern aspect, with only the morning sun, and, as their roots are then in an inactive state, have little or

no water. They should be kept free from weeds in the autumn, and have some fresh mould applied over the surfaces of the pots or tubs in which they grow, protecting them again in the winter as before, continuing the same management as in the preceding year, till the decline of the leaves in the latter part of the summer, when they should be carefully taken up, and the more hardy sorts planted out in the situations where they are to remain, as those of a warm, dry border; and the tender kinds removed into pots, to have protection from frosts in winter.

As the Persian sort is the most impatient of cold and moisture, it should constantly be kept in pots filled with light sandy earth, or a compost of loam and lime-rubbish, and be placed in such situations in the frame or green-house as to have as much free air as possible in mild weather in winter. Some of the sorts will generally begin to flower in the course of one or two years after being thus planted out; the first kind often about Christmas, which is succeeded by those of the Persian sort.

The plants in the borders should have the protection of mats or other contrivances, in severe winters, as by such means they produce a greater abundance of flowers, and these more fair and beautiful.

The varieties of the different sorts are best preserved and continued by planting pieces of the divided roots, immediately after they have been separated in the summer season, in pots, tubs, or other places, as above: but in this mode they do not increase in an expeditious manner.

These plants are very ornamental, though of small growth, in their variegated large foliage, as well as their elegant flowers, which in some of the sorts are fragrant, as those of the spring kinds.

The hardy sorts produce a fine effect in the fronts of borders or clumps in pleasure-grounds, and those of the tender kinds among other potted plants in the green-house.

The proper period of removing these plants for any purpose is about the beginning of June, when the leaves decline; but they should not be often removed, as the roots do not lose their fibres as in some others of the tuberous and bulbous rooted kinds.

CYDONIA, the Quince-Tree. See PYRUS.

CYNARA, a genus containing plants of the herbaceous hardy perennial and biennial kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Capitatae*.

The characters are: that the calyx is common ventricose, imbricate; scales numerous, roundish, fleshy, increased by a membranaceous scale-formed appendicle, which is large, roundish,

channelled, and emarginated with a spine: the corolla compound tubulous, uniform: the corolllets hermaphrodite, nearly equal: proper one-petalled, funnel-form: tube very slender; border erect, ovate, five-cleft; divisions linear, one more deeply separated: the stamina have five filaments, capillary, very short; anthers cylindric, tubulose, length of the corollule, five-toothed: the pistillum a germ, somewhat ovate: style filiform, longer than the stamens: stigma simple, oblong, emarginate: there is no pericarpium: the calyx converging but a little: the seeds solitary, oblong-ovate, four-cornered compressed: down sessile, long: the receptacle bristly.

The species cultivated are: 1. *C. scolymus*, Common Artichoke; 2. *C. cardunculus*, Cardoon Artichoke, or Cardoon.

The first, in the cultivated state, seldom rises above four feet in height, with a stout, furrowed, leafy stem, slightly tomentose, sometimes a little branched at top. The root is large, thick, and perennial, crowned by a considerable cluster of pinnatifid leaves, from two to four feet in length, pointing upright, the whole covered with an ash-coloured down, especially underneath: the midrib has a deep single channel above, and several deep furrows underneath, with strong ridges between them: at bottom there are usually several separate leaflets or rudiments of leaves, which increase in size till the main leaf begins, and are connected by a wing running down each side of the midrib; which, increasing, unites the remainder into one pinnatifid leaf, very deeply cut, and each cleft has a few large serratures or jags, ending in a short prickle, which is sometimes scarcely perceptible. The leaves on the stem are simple, only serrate or jagged, like a single cleft of the other; they end obtusely, and are frequently retuse; sometimes they have scarcely any serratures; immediately below the heads are some loose scales, partaking of the nature of the upper leaves and calycine scales. The heads are subglobular, either green or dark purple, the former commonly tinged at bottom with purple; composed of numerous, large, ovate scales, which at bottom are very fleshy, and at top obtuse and emarginate, or cloven. It is a native of the South of Europe.

The varieties are: the Green or French, and the Globe Artichoke; the former having a conical head, of a light green colour, with the scales pointed at top, opening and turning outward; and the latter with a large globular head, a little depressed at top, of a reddish-green colour, obtuse scales, growing close, and turning inwards. This is the most cultivated, as being more fleshy and better tasted.

The second species has thick, fleshy, fibry roots, crowned by a considerable cluster of large, erect, deeply-pinnatifid leaves, four or five feet high, having all the lobes pinnatifid; and thick prickly footstalks; and amidst them, upright tall stems, terminated by scaly, small heads, furnishing flowers and seed, without any eatable substance, as in the Artichoke. It is often biennial in this climate.

Culture.—These plants are increased without much difficulty, if proper care be taken to preserve them from the frosts in winter.

Culture in the Artichoke Kind.—These sorts of plants succeed best in a soil of the light deep loamy kind, well enriched by stable-dung or some other manure. Where the soil is stiff and wet they are liable to be destroyed in the winter season.

Their propagation is effected by planting the off-sets, or suckers produced from the old stools or roots, in the early spring months, as about the latter end of March, in an open situation, in rows four or five feet apart, and the same distances in the rows. The ground should be previously prepared by trenching in the dung to a good spade's depth.

In planting the off-sets, after being separated from the old plants, they should be trimmed in their leaves and other parts, and be then put in by means of a line and dibble to the depth of three or four inches. Some plant two or three plants in one place, but others only one. The latter is probably the better method, as the plants spread very much. Whichever mode is practised, the earth should be well closed about the sets, and a good watering immediately given, especially if the weather be dry; repeating it as there may be occasion.

After this they only require to be kept free from weeds during the summer, which is best performed by hoeing between the rows with a large sharp hoe; and to be protected from frost in the winter.

When large heads are wanted, all the small lateral ones should be removed as soon as they are formed to any size. In some situations the small lateral crooked heads are, however, held in much esteem, consequently must not be rubbed off. The maturity of the heads of the Artichoke is shown by the plates or scales separating from each other considerably.

In cutting the heads, six inches of the stem should be preserved to them, and in many cases, when for market, a foot or more. And care should be taken, that as the heads are cut, the stalks be broken down to the bottom and removed, in order to promote the growth of new suckers.

In order to protect the plants during the winter from being injured by frost, it is the practice

of some to earth or mould up the rows of the plants, so as to cover their crowns, forming the earth into a ridge. This is usually done about the latter end of November or beginning of the following month, the lower leaves being cut and removed before the work is attempted. The author of the Scotch Forcing Gardener, instead of ridging up the plants, advises, that they should be carefully covered with stable-dung or other litter in the beginning of winter, which he considers as better than digging trenches and moulding up with the earth from them, as the roots in that way are, he supposes, doubly exposed. Many instances have occurred where the plants managed in that method have been destroyed, while those well covered by litter have not sustained the least injury.

About the middle of March or beginning of the following month, when the plants have begun to shoot, the ridges should be levelled down, removing all the unnecessary shoots, only leaving one or two on each plant. This work should be performed when the weather is dry, and the mould be well cleared and removed from the crowns of the plants.

Where they have been covered with litter, the coarse parts should be removed about the same time, and the more reduced and rotten parts dug in, previously removing the shoots as in the former case, to prevent their being too much crowded, and producing small heads.

This culture must be repeated every year for the old roots or stools, which should not be suffered to continue more than seven or eight years in the same situation, as they then begin to produce heads that are smaller in size.

Where successions of this sort of crop are wanted, a few of the best off-sets should be planted every year as soon as possible after being taken off, in the manner that has been directed above. This practice not only keeps up the stock of plants, but continues the season of having the produce, as the young plants afford their heads much later than the old ones.

When the off-sets are to be conveyed to a distance, they should be carefully packed, eight or ten together, when dry, and bound round with a hay-band, the whole being then placed in a hamper or mat. In this case some advise moistening the roots before planting them out.

The globular-headed sort is the larger and more fleshy, but the green conical-headed the more hardy.

Culture in the Cardoon Kind.—This is accomplished, by sowing the seed in the latter end of April or beginning of May, or later, in the places where the plants are to remain. It is best done by forming trenches at the distance of

about five feet from each other in the manner directed for Celery, to the depth of a good spade, placing the mould on the sides or interspaces; then to point in a little well rotted compost manure in the bottoms, and make a small drill in the centre to the depth of an inch, dropping in the seeds two or three inches apart, covering them with the mould.

A little water should be given at the time when the season is dry.

When the plants have advanced two or three inches in their growth, they should be thinned out to the distance of ten or twelve inches. And as they proceed in their growth, they should be gradually moulded up when dry, in order to be blanched and rendered tender, in the same manner as practised for Celery; only the leaves being carefully gathered and tied together each time with a little old matting, in order to prevent the mould from getting between them.

It is likewise the practice with some to raise the plants on beds, and afterwards transplant them into drills, or holes, where they are to remain and be earthed up for blanching.

In order to have a longer succession of these plants, the moulding up should be performed at different times, from about the beginning of September, as the distance of a fortnight or three weeks.

These plants succeed best on such soils as are of the more deep sandy loam kinds, which have not been much enriched by manure.

In order to save seed, some of the best plants should be suffered to remain without being blanched, and be protected by litter during the winter, and in the spring they will shoot up into flower, and produce ripe seed in the autumn.

The roots of the Cardoon are capable of being preserved in the winter season in the same manner as the Carrot, Celery, and other similar plants.

CYNOGLOSSUM, a genus affording plants of the herbaceous annual and perennial ornamental kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliæ*.

The characters are: that the calyx is a five-parted, oblong, acute, permanent perianthium: the corolla is one-petalled, funnel-form, length of the calyx: tube cylindric, shorter than the border: border half-five-cleft, obtuse: mouth closed with five squamules, which are convex, prominent, converging: the stamina consist of five very short filaments, in the mouth of the corolla: anthers roundish, naked: the pistillum has four germs: style subulate, length of the stamens, permanent: stigma emarginate: there is no pe-

ricarpium, but four arils of the seeds, depressed, roundish, outwardly more obtuse, scabrous, not gaping, on the exterior side somewhat flattish, adnexed by their tip: the seeds as many, somewhat ovate, gibbous, acuminate, smooth.

The species cultivated are: 1. *C. linifolium*, Flax-leaved Hound's Tongue, or Venus's Navel-wort; 2. *C. Lusitanicum*, Portugal Hound's Tongue, or Venus's Navel-wort; 3. *C. omphalodes*, Comfrey-leaved Hound's Tongue.

The first seldom rises more than five or six inches high; the stalks do not branch near so much as those of the second sort: the leaves are very narrow and long, of a grayish colour, and smooth: the flowers grow in short loose panicles at the ends of the branches; are white, like those of the second, but smaller, and have umbilicated seeds, whence the name of Navel-wort. It is a native of Portugal, flowering in June.

In the second species, the whole plant is very smooth: the stem erect, round, a foot high, the branches axillary, alternate, quite simple: the leaves an inch long, gradually smaller upwards, blunt, veinless, glaucous-green: the flowers in spikes at the ends of the branches. It is a native of Portugal, flowering in June and the following month.

These two species are annual.

The third has a perennial root; branches trailing, and putting out roots from the joints: the leaves are bright green, on long slender foot-stalks: the flowers shaped like those of Borage, but smaller, and of a lively blue colour, coming from the axillas or stems in loose panicles, appearing in March and the following month.

Culture.—The two first, or annual sorts, are usually increased by sowing the seeds in the early spring, in patches, in the borders, clumps, or other places where the plants are to remain and flower, covering them in lightly. When the plants appear, they only stand in need of being kept clean, and having a little water occasionally given them.

In order to protract the flowering, two or three different sowings should be made at proper intervals in these sorts.

The third, or perennial sort, may be easily propagated by taking off the rooted stalks, and planting them out in the situations where they are to remain, either in the spring, summer, or autumn.

These plants add to the ornament and variety of borders, clumps, and other parts of pleasure-grounds.

CYPRIPEDIUM, a genus containing plants of the hardy herbaceous perennial flowery kind.

It belongs to the class and order *Gynandria*

Diandria, and ranks in the natural order of *Orchideæ*.

The characters are: that the calyx has vague spathes: spadix simple: there is no perianthium: the corolla has four or five petals, lanceolate-linear, very long, spreading, erect: nectary within the lower petal, slipper-form, inflated, obtuse, hollow, shorter than the petals, broader: upper lip ovate, flat, inflex, small: the stamina consist of two filaments, very short, seated on the pistillum: anthers erect, covered by the upper lip of the nectary: the pistillum is a long, twisted, inferior germ: style very short, growing to the upper lip of the nectary: stigma obscure: the pericarpium is an obovate capsule, obtusely three-cornered; with three sutures, under which it gapes in the corners, three-valved, one-celled: the seeds are numerous, very small: receptacle linear, growing lengthways to each valve of the pericarpium.

The species are: 1 *C. calceolus*, Common Ladies' Slipper; 2 *C. bulbosum*, Bulbous Ladies' Slipper; 3 *C. Japonicum*, Japanese Ladies' Slipper; 4 *C. album*, White Ladies' Slipper; 5. *C. acaule*, Two-leaved Ladies' Slipper.

The first has the root composed of many fleshy black fibres, spreading obliquely near the surface; the fleshy part retaining the mark of the stalk produced the former year; a new root being annually formed on the side of the old one: the stalks two, three, or more, in proportion to the strength of the root; nine, ten, or twelve inches high, and a little hairy: the leaves are from three to near four inches long, and near two inches broad at their base, of a deep green, and ending in acute points. Four or five of these leaves are placed alternately along the stalk. In the bosom of the upper leaf is inclosed the flower-bud, supported by a slender peduncle, which generally turns a little on one side; and before the flower opens advances above the sheath. The corolla has four narrow petals, of a dark purple colour, placed in form of a cross, and spreading wide open. In the centre is situated the nectary, shaped like a wooden shoe, of a pale yellow-colour, with a few broken streaks: the opening is covered with two ears; the upper one tender, white, and spotted with purple; the lower thick, and of an herbaceous colour. It is a native of Lapland, flowering in May.

In the second species the root is a bulb, throwing out a few thick fibres from its lower part, and invested with a semi-transparent, acute, erect membrane, rising far above its top: the leaf is radical, solitary, petioled, oval, somewhat pointed, entire, ribbed, smooth, dark green, spotted with brown: the stalk is three inches high, erect, round, one-flowered, invested with two

tubular, membranous sheaths: bracte solitary, not far from the flower, linear-lanceolate, acute, purplish: the flower a little inclined. It is native of Lapland, &c.

The third has a round, erect stem, villose, a foot high: the leaves in the middle of the stem two, embracing, acute, sinuate-waved, smooth, a hand broad: below the flower is a sessile, solitary, oblong, acute, entire leaflet, scarcely an inch in length: the flower terminating, solitary, the size of that of the common species. It is a native of Japan, flowering in April and the following month.

The fourth species has fibrous roots, with several upright stalks a foot high. The leaves are ovate-lanceolate, cauline, and ribbed, placed alternate, and embracing the stem, which has a white flower at top: the large nectary is tinged with purple. Martyn observes, that there are few flowers which to such singularity of structure add such elegance and beauty. It is a native of North America.

The fifth has rarely more than two radical leaves, and a very short flowering stem, in comparison with the others, but a large nectary in proportion to the size of the plant, divided on its upper part through its whole length, so as to destroy, in a great degree, that shoe- or slipper-like form from which this genus has its name. It is a native of North America, and flowers in March.

Culture.—These plants are not easily preserved in garden culture. They should remain where they are planted, if they be designed to flower as soon as possible, as they do not bear transplanting well, and are retarded in flowering by it.

The usual method of raising them, especially in the first, fourth, and bulbous kinds, is, in the former, by dividing their knotty, fibrous, creeping roots, taking off the joints or side off-sets, and planting them where they are to remain, immediately after the stems decay; and in the latter by off-sets from the roots planted at the same time.

But the best method is to procure the plants or sets from the places where they grow naturally.

They succeed the most perfectly in a loamy undunged soil, and where they have only the morning sun. The English species answers best in pots, when set in a sheltered situation. The American kinds are rather tender, requiring shelter in the winter season.

These plants are highly curious and ornamental in the shady parts of the clumps and border of pleasure-grounds.

CYRTANTHUS, a genus furnishing plants of

of the bulbous-rooted perennial kind, for the green-house.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that there is no calyx: the corolla one-petalled, club-shaped, bent, six-cleft at top; segments ovate-oblong; the three inner blunt, the three outer terminating in a little horn: the stamina consist of six filaments, fastened to the tube, filiform-subulate, a little shorter than the corolla: anthers oblong, erect: the pistillum is an inferior germ, ovate, obtusely three-cornered: style filiform, the length of the corolla: stigma trifid.

The species are: 1. *C. angustifolius*, Narrow-leaved Cyrtanthus; 2. *C. obliquus*, Oblique-leaved Cyrtanthus.

The first has a bulbous root, crowned by straight, narrow, keel-shaped leaves closing at their base; and flower-stalks one foot high, terminated by umbellate clusters of scarlet nodding narrow purple flowers, between two and three inches long each, with a bent tube. It is a native of the Cape.

The second species has a fleshy bulbous root, smooth oblique leaves, and umbellate pendulous simple flowers, terminating in a foot-stalk about one foot high. It is also a native of the Cape.

Culture.—These plants are capable of being increased either by off-sets from the roots or by seeds, but the first is the best method.

The off-sets should be taken from the roots when the stems begin to decay, and planted out in separate pots, placed under the protection of the green-house or in a garden-frame.

In the latter method the seeds should be sown in pots in the spring season, and plunged in a moderate hot-bed.

When the plants come up, and are of sufficient growth, they should be removed into separate pots.

In both methods they afterwards require the same kind of management as other bulbous-rooted plants from the same quarter.

CYTISUS, a genus containing plants of the hardy evergreen and deciduous flowering shrubby kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, bell-form, short, obtuse at the base: mouth two-lipped; upper-lip two-cleft, acuminate; lower three-toothed: the corolla is papilionaceous: standard ovate, rising upwards, sides reflex: wings the length of the standard, straight, obtuse: the keel somewhat bellied, acuminate:

the stamina consist of diadelphous filaments, (single and nine-cleft) rising upwards: anthers simple: the pistillum is an oblong germ: style simple, rising upwards: stigma obtuse: the pericarpium is an oblong legume, obtuse, attenuated at the base, stiff: the seeds few, kidney-form, compressed.

The species are: 1. *C. Laburnum*, Laburnum; 2. *C. sessilifolium*, Common Cytisus; 3. *C. hirsutus*, Hairy or Evergreen Cytisus.

The first has a large upright tree-stem, branching into a full-spreading head, from ten to twenty feet high, having smooth greenish branches, trifoliate, oblong-oval entire leaves, on long slender foot-stalks; and from the sides of all the branches numerous yellow flowers collected in long spikes, hanging loosely downward; appearing in May. It is a native of Switzerland.

The varieties are: the Common broad-leaved; the Narrow-leaved; Long-spiked, having very long pendulous spikes of flowers; the Short-spiked, having short, roundish, thick spikes of flowers; and the Variegated-leaved Laburnum.

The second species rises with a woody stalk, putting out many branches, covered with a brownish bark: the leaflets are obovate, ternate, on very short petioles: the flowers in close short terminating racemes, of a bright yellow colour: it rises to the height of seven or eight feet, and becomes very bushy. It is a native of the South of Europe.

The third has a soft shrubby stalk, dividing into many branches, which grow erect, and frequently rise to the height of eight or ten feet: the stalks, branches, and leaves are very hairy; the leaves are ternate, ovate, and placed closely on the branches: the flowers come out from the side of the stalk in short racemes, and are of a pale yellow, appearing in June. It is a native of the South of Europe.

Culture.—These plants are all capable of being increased by seeds, and many of them by cuttings and layers.

In the first mode the seed should be sown, either on beds or where the plants are to remain, in the spring, as about March, being in the first mode, when of sufficient growth, transplanted into nursery rows, to remain till of a proper size for being planted in the situations where they are to grow. When sown where they are to remain, they only require to be kept perfectly free from weeds, and trimmed to one good plant in a place, giving the tender sorts the protection of mats during the severity of the winter season.

The trees of most of the sorts afford seeds in abundance in the autumn.

The cuttings should be made from the young



Painted by Syd. Edwards

London Published Mar 11806 by G. Kearsley Fleet Street

Engraved by F. J. Smith

1 *Dahlia pinnata*
Purple Dahlia.

2 *Dahlia crocata*
Yellow Dahlia.



Painted by Wm. Edwards

London Published Dec 1 1803 by G. Kearsley Fleet Street

Engraved by F. Simpson

1 *Daphne Genkwa*
Trailing Daphne

2 *Dracopis virginicum*
Virginian Dragons head

shoots ten or twelve inches in length, and planted out in a rather moist, shaded situation, either in the early autumn or spring months, in rows twelve or eighteen inches apart, and eight or ten in the rows. They mostly become well rooted in the course of twelve months; and should then be kept perfectly clear of weeds.

Layers may be laid down either in the summer, autumn, or spring seasons; and when the plants are well rooted they should be taken off and planted out in nursery-rows, as described above.

In the nursery they only require to be preserved from the injury of weeds, and to have the land dug well between the rows annually in the

autumn, till they are removed; being suffered to take their natural growth in a great measure.

Most of the sorts are hardy, and succeed well in almost any soil or situation. The third sort should have a dry soil and sheltered situation, as it is liable to be injured by frost. It may also be planted in pots, and placed in the greenhouse during the winter.

They are all very ornamental plants for the borders, clumps, and other parts of ornamented grounds, affording much variety by their numerous beautiful bunches of flowers. The large sorts should be placed towards the back parts, and those of less growth towards the fronts and more conspicuous parts.

D A I

DAFFODIL. See NARCISSUS.

DAIS, a genus containing a plant of the deciduous shrubby ornamental kind for the green-house.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Vepriculæ*.

The characters are: that the calyx is a four-leaved involucre, sessile-many-flowered: the leaflets scariose, erect: there is no perianthium: the corolla one-petalled, funnel-form, longer than the involucre: tube filiform, rude: border five-cleft: divisions lanceolate, obtuse: the stamina consist of ten filaments, inserted into the throat, shorter than the border: the alternate ones shorter: anthers simple: the pistillum is a germ somewhat oblong, growing on the base of the corolla: style filiform, length of the tube: stigma globose, ascending: the pericarpium is a berry ovate, one-celled: the seed single, ovate.

The species cultivated is *D. cotinifolia*, Cotinus-leaved Dais.

The leaves are opposite, obovate, quite entire, smooth, and petioled: the flowers in a bunch aggregate, terminating, pubescent; with a gemmaceous four-valved involucre: the fruit is a small nut of an ovate-acuminate form, with a thin bark over it, and clothed with the permanent corolla: the epidermis is membranaceous, pale, diaphanous, thickening on each side into a prominent, whitish edge, easily separating: shell bony, thin, brittle, livid white on the

D A P

outside, black within; one-celled and valveless. It is a native of the Cape of Good Hope.

Culture.—This shrubby plant is capable of being increased, by sowing the seed procured from Holland in pots of light earth in the spring, and plunging them in a hot-bed: when the plants have attained sufficient growth, they should be removed into separate pots, and placed in the protection of the green-house.

It sometimes succeeds by layers and cuttings made from the young shoots.

The difficulty of increasing it renders it a scarce plant.

DAPHNE, a genus comprising plants of the low shrubby ornamental, evergreen, and deciduous kinds.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Vepriculæ*.

The characters are: that there is no calyx: the corolla one-petalled, funnel-form, withering, including the stamens: tube cylindric, imperforate, longer than the border: border four-cleft; divisions ovate, acute, flat, spreading: the stamina have eight, short filaments, inserted into the tube; the alternate ones lower: anthers roundish, erect, two-celled: the pistillum is an ovate germ: style very short: stigma headed, depressed-flat: the pericarpium a roundish one-celled berry: (drupe berried superior;) the seed single, roundish, fleshy.

The species are: 1. *D. Mezereum*, Mezereon; 2. *D. Laureola*, Wood or Spurge Laurel; 3. *D. tatarica*.

touraira, Silvery-leaved Daphne, or *Taitouraira*; 4. *D. cneorum*, Trailing Daphne; 5. *D. odora*, Sweet-smelling Daphne.

The first is a shrub, growing to the height of from three or four to five or six feet, with a strong woody stalk, putting out many woody branches on every side, so as to form a regular head. The leaves are smooth, about two inches long, and three quarters of an inch broad in the middle, placed without order. The flowers come out very early in the spring, before the leaves, in clusters all round the shoots of the former year. The fruit is a superior berried drupe, first green, then red, of an ovate-globular form; with a thin succulent pulp, and a crustaceous, thin, brittle, black shining shell. It is a native of Lapland, &c. flowering in January, in mild seasons.

Martyn remarks, that there are two principal varieties; one with a white flower, succeeded by yellow berries; the other with peach-coloured flowers and red fruit: the latter has sometimes flowers of a much deeper red: and that there is also a variety with variegated leaves.

The second species is a low evergreen shrub, rising with several stalks to the height of two or three feet, dividing at top into several branches. The leaves come out irregularly on every side, sit pretty close to the branches, are thick, smooth, and of a lucid green. Among these, towards the upper part of the stalks, come out the flowers in small clusters; they are of a yellowish green colour, and appear soon after Christmas if the season be not very severe. They are succeeded by oval berries, which are green till June, when they ripen and turn black, soon after which they fall off. It is a native of Britain, &c.

The third species is a low shrubby plant, which sends out several weak stalks from the root, about a foot long, and spreading about irregularly; these seldom become woody in England, but are tough and stringy, covered with a light bark: the leaves are small, very soft, white and shining like satin, and sit pretty close to the stalks: between these, white flowers come out in thick clusters, commonly two or three together, very seldom solitary, bell-shaped, silky on the outside, but yellowish within, imbricated at the base with four or more ovate keeled scales. It is a native of the South of France.

The fourth species is a very humble shrub, seldom more than one foot high: the stems are branched; the leaves narrow lanceolate, placed without order: the branches terminated by small clusters of purple flowers, which stand erect: the flowers emit a pleasant odour, and appear early in the spring. It is a native of France, &c.

It varies with white flowers.

The fifth has the stem becoming shrubby, dichotomous, smooth, naked, erect; the branches, like the stem, from divaricate erect: the leaves at the top of the last branchlets, approximating, sessile, acute, quite entire, spreading, bent back at the tip; deep green on the upper surface, with a groove along the middle, paler underneath; unequal, thick, evergreen, an inch in length: the flowers about eleven in number, of a purple colour. It is a native of Japan, flowering here from December to March.

Culture.—These plants are capable of being raised in different methods according to the kinds.

The first sort and varieties are best propagated by sowing the seeds or berries, as soon as they have become perfectly ripe, as about August, on beds of light sandy earth, covering them in to the depth of half an inch. When possible, a south-easterly aspect should be chosen. And to preserve the seeds in a perfect state, the shrubs should be netted in the latter end of the summer, to prevent the attacks of the birds.

The young plants generally appear in the following spring, when they should be kept clear from weeds, and the largest ones removed when too close together: they may remain in these beds till the beginning of the second autumn, when they should be removed, and set out in nursery-rows, at the distance of a foot and half, and ten or twelve inches in the rows, great care being taken not to break or injure their roots. After they have had two years' growth in these situations, they are in a proper condition for being planted out where they are to remain: and as the plants flower very early in the spring, the best time for removing them is in the early part of the autumn.

The plants grow to the greatest size, and flower in the most full and perfect manner, when the soils are of a dry quality: as in moist, adhesive soils they are apt to become mossy.

The second species may be increased by sowing the seeds in the same manner as the above; and also by cuttings and layers of the young shoots: these should be planted out or laid down in the beginning of the autumn, and in the following autumn they will be well rooted: the layers may be then taken off, and planted where they are to remain, or put into nursery-rows as above. The cuttings may likewise be treated in the same way.

The third and fourth sorts succeed best when raised from seed procured from abroad, and sown on a warm dry situation, in the early autumn, in the places where the plants are to remain, as they do not bear transplanting well. The ground should be as little as possible stir-

red about the plants. The former should have a dry warm aspect where the land is poor, but the latter succeeds in such as are more cool: these plants are sufficiently hardy to succeed in the open air, when the winters are not very severe.

The last sort is raised by sowing the seeds procured from its native situation, on a gentle hot-bed in the autumn or spring, and when the plants are of sufficient growth removing them into separate pots, to be placed under the protection of the greenhouse. It is much more tender than the other sorts.

The first and second kinds are highly ornamental plants in the clumps, borders, and other conspicuous parts near the house, the former flowering early, and where many are together affording a fine fragrance.

The other sorts, though more tender, are curious, and afford an agreeable variety in assemblage with others of similar growth, either in the borders or among potted plants.

DATURA, a genus affording plants of the herbaceous flowery annual kind. Thorn Apple.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Lurideæ*.

The characters are: that the calyx is a one-leaved, oblong perianthium, tubular, bellied, five-cornered, five-toothed, horizontally deciduous near the base, the remaining circular part permanent: the corolla one-petalled, funnel-form: tube cylindric, almost longer than the calyx: border erect-expanding, five-cornered, five-plaited, almost entire, with five acuminate teeth: the stamina consist of five subulate filaments, length of the calyx: anthers oblong, compressed, obtuse: the pistillum is an ovate germ: style filiform, straight: stigma thickish, obtuse, two-plaited: the pericarpium is a somewhat ovate capsule, two-celled, four-valved, seated on the base of the calyx: receptacles convex, large, dotted, affixed to the dissepiment: the seeds numerous and kidney-form.

The species cultivated are: 1. *D. Stramonium*, Common Thorn-apple; 2. *D. Tatula*, Blue Thorn-apple; 3. *D. fastuosa*, Purple Thorn-apple; 4. *D. Metel*, Hairy Thorn-apple; 5. *D. arborea*, Tree Thorn-apple.

The first has the stem from one to six feet in height, according to the soil, but seldom more than two feet, round, smooth; dividing into many strong, irregular branches, which are hollow, covered with a fine down: the leaves from the forking of the stem and branches, single, scarcely six inches long, petioled, pointed, deep green on the upper surface, paler beneath and on the edges, with strong ribs or nerves, unequally

sinuated and toothed about the edge, extending further down the petiole on one side than on the other: the petioles round, downy, shorter than the leaves, above faintly channelled: the flowers single from the axils, on short peduncles, upright (first from the forks of the branches, and afterwards near the extremities), of a whitish colour, succeeded by oval prickly capsules, termed thorn-apples. It is a native of America.

The second species resembles the common sort, but is twice the size: the stem is purplish with white dots, divided at an acute angle, smooth and even: the leaves more finely toothed, and, if they be flatted, cordate: the flowers pale blue, or purple, succeeded by erect spinous capsules.

The third rises with a fine polished purple stalk four feet high, dividing into several branches: the leaves are large, smooth, sinuated, on pretty long foot-stalks: the flowers are produced at the divisions of the branches; they have large swelling tubes, which spread very broad at the top, their brims having ten angles, each ending in a long slender point, are of a beautiful purple on their outside and a satiny white within; some of them single, others with two or three flowers standing one within another, and some double, having four or five petals within each other of equal length, so as to appear a full flower at the brim; they have an agreeable odour at first. It is a native of the East Indies.

The fourth species has a strong stem three feet high, dividing into many woolly branches: the leaves have only two or three slight indentures on their edges: the flowers have long tubes, which extend beyond the bifid calyx, then spreading out very broad where the brim is divided into ten obtuse angles; they are of a pure white above, but the tubes have a tincture of green within: they are succeeded by roundish fruit closely covered with thorns. It is a native of Asia, &c.

The fifth rises with a woody stalk to the height of twelve or fourteen feet, dividing into several branches. Leaves oblique, six inches long, two inches and a half broad in their widest part, growing narrower at each end, downy, on long footstalks, which stand nearer to one side than the other. The flowers come out at the divisions of the branches; they have a loose tubular calyx near four inches long, which opens at the top on one side like a spathe: the tube of the flower is narrow; but above, it swells very large, near six inches in length, then spreads open at the brim, where it is divided into five angles, which terminate in very long points; they are white, with some longitudinal

stripes, of a pale yellow on their outside; a single tree will perfume the air of a large garden. It is a native of South America.

Culture.—These plants are propagated annually, by sowing the seeds in the two first or hardy sorts in the clumps, borders, or other places where the plants are to remain, in patches of four or five together, covering them in to the depth of nearly half an inch. When the plants are up the weakest should be removed, so as to leave only one or two of the strongest in each place: but in the latter or tender sorts the seed should be sown in the spring season, as the latter end of March or beginning of the following month, either on a hot-bed covered by frames and glasses, or in pots, and managed as other tender annuals, admitting air to them freely in their early growth, and when some inches high removing them into separate pots, replunging them in the hot-bed so formed as to draw them up to a pretty tall growth. When the weather becomes settled warm, as about June, they may be removed into the open air, being previously hardened by due exposure, either in the pots, or planted out in the borders or other places, with balls of earth about their roots. The two first kinds are the best suited to the last method.

The first and second species are adapted to large borders of pleasure-grounds, where they have a good effect in mixture with others of similar growth; but the first is sometimes troublesome as a weed. The other kinds, from the beauty of their flowers, produce a pleasing variety in assemblage with other potted annual plants. See ANNUAL PLANTS.

DATE PLUM. See DIOSPYROS.

DATE TREE. See PHENIX.

DAUCUS, a genus containing a plant of the esculent kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellales*.

The characters are: that the calyx is an universal umbel, manifold, flowering flat, fruiting concave-converging: partial manifold, similar: involucre universal, many-leaved length of the umbel: leaflets linear, pinnatifid: partial more simple, length of the umbellule: perianthium proper scarce manifest: the corolla universal difform, somewhat rayed; floscules of the disk abortive: proper of five petals, inflex-hearted; the exterior ones larger: the stamina consist of five capillary filaments: anthers simple: the pistillum is an inferior germ, small: styles two, reflex: stigmas obtuse: there is no pericarpium: the fruit ovate, often hispid on every side with stiff hairs, bipartite: the seeds two, somewhat

ovate, on one side convex, hispid, on the other flat.

The species cultivated is *D. Carota*, Common Carrot.

It has a long, large perpendicular tapering root, from fifteen to eighteen inches in length, with long erect finely divided leaves, having the stem three feet high in its flowering state; it differs little from the wild carrot, except in the largeness and succulency of the plant, and particularly of the root, which with its superior size usually takes a tincture of yellow in different shades to deep orange, and becomes of a softer texture, without any of that acrimony and aromatic flavour which is found in the wild root: it has white flowers on all the branches. It is annual, flowering from June to August.

There are varieties with orange coloured roots, termed Orange Carrot, with a shorter red root, termed Early Horn-carrot, with a purple root, and with a light yellow root.

Culture.—In the culture of this useful vegetable, a deep light soil should be employed as much as possible, and when of a sandy quality it is still more advantageous. It should have been well manured the preceding year, as when it is applied the same year the roots are apt to be affected with the canker. Where it is made use of the same year, it should be well rotted, as such as has been used in the hot-bed.

In preparing the ground, it should be well trenched over at no great length of time before the period of sowing, to the full depth of eighteen inches, the lumps being well broken and reduced, and the manure when used at the time completely turned in. When this business is not performed in a perfect manner, the roots are liable to spread in a lateral manner, and become branched.

The situation should be open, and free from the droppings of trees, or other inconveniences of the same kind.

The seed for this crop should always be such as has been collected from plants of the preceding year, and which is perfectly fresh and well ripened; as old seed never answers well in this culture, much of it being in a state incapable of vegetating.

The sort most proper for the different garden crops, is for the early ones the Horn-Carrot, but for the general crop, the Orange is constantly to be employed, not only as growing more large, but more straight and handsome, and keeping better, as well as being more sweet and pleasant in the taste.

The other varieties may be grown where variety is wanted. Whatever sort is made use of, it is of much consequence to have genuine seed.

The time of sowing this sort of crops must vary according as they are wanted. When they are required in succession, three or four different sowings should be made from January till the beginning of May; but for the principal crop, the sowings should always be performed about the latter end of January, or in the beginning of the following month. A sowing may likewise be made in August, to stand through the winter, for producing an early spring crop; or early crops of this sort may be obtained by forcing them on hot-beds. The principal crop generally becomes ready for use about the beginning of June.

In the sowing of the seed, after the surface of the beds has been rendered perfectly smooth and even by the rake, it should be distributed in as even a manner as possible over the whole, and then carefully raked in. As the seed is of a light and chaffy nature, a calm dry time should be chosen for the purpose, to prevent its being blown in an irregular manner into heaps. It is also useful to rub and separate the chaffy parts of the seed well before sowing, and some think it an advantage to have sand or dry fine mould well mixed with it. It should be sown moderately thick, especially when the soil inclines to be heavy. In very light soils it is sometimes the practice to tread in the seed, to prevent its rising in heaps, raking the surface over afterwards; but this should never be done where there is any degree of stiffness in the land. The sowings are usually performed on beds of four or five feet in breadth, but they may be made on large plats where necessary.

After the plants have attained three or four inches in growth, they should be thinned out to from six to eight inches distance, in proportion to the size that is wanted; and be kept perfectly free from weeds: this is performed by a small hoe with the greatest readiness; but some thin their plants out by the hand; the former is however the better method, as the earth is at the same time stirred about the roots of the plants. The work is best done when the weather is dry. The crops should afterwards be occasionally looked over every fortnight or three weeks, to be further thinned when necessary, and to keep the weeds from rising.

Where these roots are much wanted at an early period while young, it is better to sow a piece of ground for the purpose than to depend upon the thinnings of the general crops.

The crops put in in August for the following spring produce, should be managed in the same way, but it will be necessary to protect the plants in winter, when the weather is severe, by coverings of some light dry materials,

such as litter, straw, &c. so as to prevent their tops from being injured.

Culture on Hot-beds for early Use.—In this method crops may be provided for early use where those of the autumn have been injured or destroyed.

In this intention the sowings should be made in the beginning of January and the following month, on hot-beds formed of dung, moulded eight or ten inches deep, and covered by frames and glasses. In the growth of the plants air must be freely admitted by having the glasses removed, except in the night-time and when the weather is severe. When the plants are an inch or two in height, they must be thinned out to the distance of three or four inches, and occasionally supplied with water in a moderate proportion. When the heat of the beds declines much, linings should be had recourse to as there may be occasion.

By this management these roots may be provided a month or six weeks sooner than in the other methods.

In order to preserve the roots of the main crops in the winter, they should be taken up about November, when the season is dry; and when sufficiently dried in the air, and cleared from earth, and their tops cut off close, be packed up in dry sand in a shed, cellar, or other convenient place, being well covered on the top with straw. In this mode they may be preserved till March or April. If they are suffered to remain in the ground, they are not only liable to be destroyed by vermin, but to become canker, and rotten.

In order to save the seed of these plants, some of the finest roots should be planted out about February, in rows two feet apart, and one foot distant from plant to plant. They shoot up to stem in April or the following month, flower about June, and in August the seed becomes ripe; then the tops should be cut off when dry, exposed in the sun, and, after becoming perfectly dry, the seed thrashed out, and put up into bags for use.

DECIDUOUS PLANTS, such plants, whether of the tree or shrub kind, as shed or lose their leaves in the autumnal or winter seasons.

It embraces a great variety of both the former and latter sorts, in most of which the leaves begin to fall off in the autumn, and the whole are naked during the winter season.

Almost all the valuable timber and fruit-trees are of this tribe, as well as the greatest part of the ornamental trees and shrubs that are introduced in plantations and shubberies. There are likewise several other plants that may be termed deciduous, from their shedding their leaves on

the approach of winter. See FRUIT- and FOREST-TREES.

This sort of trees and shrubs are in general of hardy growth, being capable of succeeding well in the full ground in different situations, according to their kinds.

Particular descriptions of the different sorts, as well as of their habits of growth, culture, management, and uses, are given under the genus to which they respectively belong.

The proper seasons for removing this kind of plants from the nursery or other places, and planting them out where they are to remain, are either the early spring or autumn, according to the kind and the nature of the soil. In general, where the land is dry, the latter is the more proper and advantageous; but in the contrary circumstances the former may be the more advisable. In the planting out all trees, shrubs, and other plants of this sort, sufficiently large openings should be formed for the roots to be conveniently bedded in, after having been suitably trimmed according to the kinds; and the mould be made fine and well mixed in with the roots by slightly shaking the plants, and then well trodden in about them. In the early plantings at both seasons it is of much advantage, especially when the weather is dry, to have them well watered occasionally, and most of the sorts should be kept steady in their situations by proper stakes, as they never succeed well where this is not the case.

DELPHINIUM, a genus comprising plants of the herbaceous flowery hardy annual and perennial kinds. Dolphin Flower.

It belongs to the class and order *Polyandria Trigynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx: the corolla has five petals, unequal, disposed in a circle; of which the uppermost in some is more obtuse than the rest in front, and is extended behind into a tubular, straight, long, obtuse horn: the rest ovate-lanceolate, spreading, nearly equal: nectary two-cleft, seated in front within the circle of petals on the upper part, behind stretched out, involved within the tube of the petal: the stamina have very many filaments (fifteen or thirty), subulate, wider at the base, very small, inclined towards the petal: anthers erect, small: the pistillum consists of three or one germ; ovate, ending in styles the length of the stamens: stigmas simple, reflex: the pericarpium has as many capsules, ovate-subulate, straight, one-valved, gaping inwards: the seeds very many, and cornered.

The species mostly cultivated are: 1. *D. adjacis*, Upright Larkspur; 2. *D. grandiflorum*,

Great-flowered Bee Larkspur; 3. *D. elatum*, Tall Bee Larkspur.

There are other species that may be cultivated.

The first is annual, and has the stalks eighteen inches and more in height, seldom branched: the leaves are finely divided, commonly by threes, on broad petioles: the segments are linear, quite entire, and channelled above; the spike of flowers erect, dense, and of different colours.

There are varieties with single and double blue flowers; with single and double purple flowers; with single and double silver-coloured flowers; with single and double violet-coloured flowers; with single and double ash-coloured flowers; with single and double striped flowers; Large Rocket Larkspur, and Dwarf or Rocket Larkspur.

The second species has a perennial root, which puts out two or three branching stalks every spring, rising about a foot and a half high: the leaves are smooth and of a light green colour above, and hoary beneath, composed of many narrow segments, which terminate in several acute points: the flowers come out towards the upper part of the stalks singly, each on a long naked peduncle; they are large, and of a fine azure colour. They appear in June and July, and the seeds ripen in autumn. It is a native of Siberia.

The third rises to the height of a man: the root is perennial: the leaves slightly villose, becoming smooth by age, half-five-lobed, petioled; lobes acute, often half-three-lobed, sharply serrate. The spikes of flowers very long and handsome, of a deep blue colour, with a wrinkled spur. It is a native of Switzerland, &c. flowering from June to September.

Culture.—These plants, in all the sorts and varieties, are propagated by sowing the seeds in the early spring, as in February, March, or the following month, or in the autumn immediately after the seeds become ripe, in the clumps, borders, or other places where the plants are to remain, as they do not succeed so perfectly by transplanting, in patches of eight or ten in a place, covering the seed in to the depth of nearly half an inch, the mould being previously rendered fine.

Where the annual sort and varieties are cultivated for a large show, the seed may be sown thinly in drills on beds four feet broad, at a foot distance, covering it in to the above depth. They are sometimes sown in other forms for the purpose of appearance.

The autumn sowings of these seeds should be marked by placing small sticks in the places, to prevent their being disturbed by the spring digging of the ground.

The only culture the plants in general require



Painted by Syd Edwards

London Published Nov 1865 by G. Kearsley Fleet Street

Engraved by F. Sanford

Delphinium elatum
1 Larkspur.

Dianthus barbatus
2 Sweet William.

after they appear, is that of thinning them in a proper manner, according to circumstances, and keeping them free from weeds. And in the perennial sorts removing the stems in the autumn.

These plants afford much ornament and variety in the different compartments of pleasure-grounds, and they succeed in most soils and situations, being of hardy growth.

DENTARIA, a genus affording plants of the herbaceous flowery hardy perennial kind. Tooth Violet.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ*.

The characters are: that the calyx is a four-leaved perianth: leaflets ovate-oblong, converging from parallel, obtuse, deciduous: the corolla is four-petalled cruciform: petals roundish, obtuse, scarce emarginate, flat, ending in claws the length of the calyx: the stamina consist of six subulate filaments, length of the calyx, of which two are shorter: anthers cordate-oblong, erect: the pistillum is an oblong germ, length of the stamens: style very short, thick: stigma obtuse, emarginate: the pericarpium is a long columnar silique, two-celled, two-valved, bursting open elastically with the valves rolled back: dissepiment a little longer than the valves: the seeds are many, and somewhat ovate.

The species chiefly cultivated are: 1. *D. pentaphylla*, Five-leaved Dentaria, or Tooth-wort; 2. *D. bulbifera*, Bulbiferous Dentaria, or Coral-wort.

Other species may be cultivated.

The first rises with a strong stalk a foot and half high, with a leaf at each joint, composed of five lobes, four inches long, and near two broad in the widest part, ending in acute points, and deeply serrate; they are smooth, and stand on long footstalks; the flowers grow in loose spikes at the top of the stalks, are small, and of a blush colour. It is a native of Switzerland, &c.

The second species has a perennial root: the stem is simple, a foot in height; the lower leaves have three pairs of leaflets, and an odd one which is confluent with the pair below it; they are bluntly lanceolate and serrate; the leaves above these have five leaflets, and the upper leaves are trifid or simple, acutely lanceolate, serrate: the flowers are in clusters on the tops of the stalks, and flesh-coloured or purple. The scaly bulbs in the axils of the upper leaves, falling off, take root, and propagate new plants; so that it rarely produces seed. It is a native of Sweden, flowering in April and May.

Culture.—The propagation in these plants is effected by sowing the seeds in a light sandy soil where the situation is shaded, either in the au-

tumn as soon as they are perfectly ripened, or in the early spring. The former is the better season where the soils are sufficiently dry. They are also capable of being increased by parting the roots, and planting them out, where there is a due degree of moisture and shade, in the autumn or spring; and in the latter sort they may be raised by planting the bulbs produced on the sides of the stems.

The only culture the plants stand in need of afterwards is that of keeping them clean from weeds, and in the first method removing such plants as may be too much crowded, to proper situations in the spring. They mostly flower and produce seeds in the second year's growth.

These plants are well adapted to the borders and other parts of shady walks and other similar compartments, where they grow well, and have an ornamental effect.

DIANTHUS, a genus furnishing plants of the herbaceous flowery ornamental kind.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a cylindric perianthium, tubular, striated, permanent, five-toothed at the mouth, surrounded at the base with four scales, of which the two opposite are lower: the corolla has five petals, claws length of the calyx, narrow, inserted into the receptacle: border flat; the plait outwardly wider, obtuse, crenate: the stamina consist of ten subulate filaments, length of the calyx, with spreading tips: anthers oval-oblong, compressed, incumbent: the pistillum is an oval germ: styles two, subulate, longer than the stamens: stigmas bent back, acuminate: the pericarpium is a cylindric capsule, covered, one-celled, gaping open at top four ways: the seeds a great many, compressed, roundish: receptacle free, four-cornered, shorter by half than the pericarpium.

The species chiefly cultivated in the garden are: 1. *D. barbatus*, Sweet William, or Bearded Pink; 2. *D. caryophyllus*, Clove Pink, or Clove Gilliflower; 3. *D. deltoides*, Common or Madder Pink; 4. *D. plumarius*, Feathered Pink; 5. *D. cæsius*, Gray-leaved or Mountain Pink; 6. *D. Chinensis*, China Pink; 7. *D. superbus*, Superb Pink.

The first has a perennial fusiform root: the stems are upright, jointed, smooth, a foot and half high, branched: the leaves, soft, veined, connate, from half an inch to almost an inch broad in the widest part, bright green; the bundles of flowers compact, unbelled, and sessile. These are of different colours, in different varieties. It is a native of Germany.

The principal varieties are: the Broad-leaved,

or Sweet-Williams: the Narrow-leaved, or Sweet-Johns; with single and double flowers in each.

The chief of the sub-varieties in the first or *broad-leaved* kind are, with broad leaves and tall deep red flowers, with tall flesh-coloured flowers, with pure white flowers, with white dotted flowers, with striped leaves and red flowers, large double rose-coloured with sweet-scented flowers, large double with deep purple burster flowers, and with double variegated flowers.

In the second, or *narrow-leaved* sort, with narrow leaves and deep red flowers, with pale red flowers, with pale red and flesh-coloured flowers, with purplish white-eyed flowers, with snow-white flowers, with white and flesh-coloured flowers, with white and purple flowers, with white spotted flowers, and with red flowers and white borders, or Painted Lady Sweet-Williams.

It is observed by Martyn, that the broad-leaved sort, with very double flowers of a deep purple, inclining to blue, bursting the calyx, is not so much esteemed; but that the double Rose Sweet-William, with flowers of a fine deep rose-colour, and smelling sweet, is much valued, as it does not burst. The Mule, or Fairchild's Sweet-William, which is one of the narrow-leaved double sorts, supposed to have been produced from seeds of a Carnation impregnated by a Sweet-William; the flowers are of a brighter red than in either of the former; their bunches not quite so large, but the flowers have an agreeable smell. The narrow-leaved kind are in general the most productive of double flowers.

The second sort, in its natural state, has the root large, woody, and branched: the stems a foot or eighteen inches high, decumbent at bottom, jointed and branched: the leaves are glaucous, smooth, linear, a line in breadth: every branch is terminated by one, two, or three flowers. These flowers, in the improved garden plant, have a spicy odour.

There are both single and double varieties, with reddish flowers, with variegated red and white flowers, with variegated red, white, and purple flowers, with variegated red, scarlet, purple, and white flowers, and with variegated red or purple above and white underneath.

The Carnations are distinguished by modern florists, from the difference of variegation, into four classes:—as *Flakes*, having two colours only, and their stripes large, going quite through the leaves. *Bizarres*, with flowers striped or variegated with three or four different colours, in irregular spots and stripes. *Piquettes*, having a white ground, spotted or pounced with

scarlet, red, purple, or other colours. *Painted Ladies*, with the petals of a red or purple colour on the upper side, and entirely white underneath.

Each of these classes have numerous sub-varieties, especially the third, which was formerly in most esteem with florists; but of late years the *Flakes* have been in greater request. It is useless however to enumerate their sub-varieties, as they are not by any means permanent.

The properties of a good Carnation are thus stated by florists:—The stem of the flower should be straight, strong, and able to support the weight of the flower without hanging down: the flower at least not less than from thirty to forty-five inches high: the petals well formed, long, broad, stiff, and pretty easy to expand, or, as the florists term it, make free flowers, being neither too close nor too thin; the middle of the flower not advanced too high above the other parts; the colours bright, and equally marked all over the flower: the flower very full of petals, so as to render it, when blown, very thick in the middle, with the outside perfectly round. And Martyn adds, “that the lower or outer circle of petals, commonly called the guard leaves, should be particularly substantial; should rise perpendicularly about half an inch above the calyx, and then turn off gracefully in a horizontal direction, supporting the interior petals, which should decrease gradually in size as they approach the centre, which should be well filled with them. All the petals should be regularly disposed, and lie over each other in such a manner as that their respective and united beauties may meet the eye all together; they should be nearly flat, or at most have a small degree of inflection at the broad end; their edges perfectly entire, without notch, fringe, or indenture. The calyx should be at least an inch in length, sufficiently strong at top to keep the bases of the petals in a close and circular body: the colours distinct, and the stripes regular, narrowing gradually to the claw of the petal, and there ending in a fine point. Almost one half of each petal should be of a clear white, free from spots.”

These properties are, however, chiefly expected in the fine potted varieties, which on coming into blow are usually placed together upon a stand or stage considerably raised and covered, in order to produce the fullest effect, and by protecting them to continue longer in beauty.

The double varieties, as being more large and beautiful in their colours, should be principally cultivated. Some of them, especially the *Bursters*, are extremely large, as three or four inches in diameter over the crown.

Whole Blowers and *Bursters* are common to

most of the varieties, especially the *Flakes* and *Bizarres*; the former are those in which the calyx or outer cup is long and of equal growth, opening regularly each way only at top, to admit a free and equal expansion of the petals all round: the flowers in these, though somewhat smaller, are more equally expanded, and require less trouble in the management of their bloom than in the *Bursters*. The latter are those in which the cup is large, and as it were swollen, being liable to burst on one side, and permit the petal to break out and produce irregular flowers, if care be not taken to prevent it by tying, and opening the calyx a little on the opposite side. The *Whole Blowers* are on this account the more convenient for culture, where much time cannot be spared in attending to the flowers.

The third species has numerous barren stems, reclining, and putting forth roots, the flowering stems from six to eight inches high, columnar below, square at top, slender, weak, but usually erect, sometimes simple, sometimes branched or dichotomous, swollen at the joints, slightly pubescent: the leaves are in pairs at each joint, linear or subulate, nearly the length of the internode, converging to the stalk, and embracing it at the base, slightly pubescent; those of the barren branches narrower: the peduncles are round, downy, from the ends of the stem and branches, single, or two from the same joint, each bearing one flower: the petals are toothed at the edge, bright red above, pale beneath; but according to Ray reddish, with a ring of deeper-coloured dots surrounding the eye; with dark purplish teeth near the throat, and beset with white silvery points, with hairs proceeding from them: the petals vary much in colour, being sometimes of a very pale flesh colour, sometimes deep red, but always marked with a ring of deeper red dots near the centre of the flower. It is a native of Sweden, &c.

There is a cultivated variety in gardens with white flowers, with a beautiful purple ring, and leaves rather more glaucous than in the common sort.

The fourth species has the stems ascending, a foot or eighteen inches in height, and branched: the leaves of a grayish or glaucous hue, a line and half wide, very sharp at the end: the flowers one, two, seldom three, at the ends of the branches, and sweet-scented: the calyx is of a glaucous-green, longer than in the other species: the petals large, light red or bright purple, sometimes white, with a circle of red; deeply jagged, having a red down at the base of the lamina or border. It is a native of Europe; flowering from June to August, and is perennial.

The fifth, according to Dr. Smith, has a woody root: the stalks several, a span high, erect, simple, smooth, quadrangular, having two or three pairs of leaves on them, one-flowered, scarcely ever two-flowered: the leaves are linear-lanceolate, bluntish, glaucous: the scales of the calyx only one third of the length of the tube, ovate-roundish, bluntly mucronate and striated: the petals are flesh-coloured, with a double row of blunt notches, marked with lines, and bearded at the base. It is a native of Switzerland.

In the sixth, the flower-stems are from six to eight or nine inches high, branching out on every side; the branches grow erect, and are terminated each by one flower: the flowers have no scent, but, having a great variety of colours, they are a considerable ornament to the flower-garden from July until the autumn: they have been greatly improved by culture; some flowers being as full of petals as the best double Pinks, and display the most glowing and vivid red colours. It is a native of China.

Martyn observes, that the roots often last two years in a dry soil; but they are generally raised from seeds annually. In the nursery-grounds it is generally known by the name of Indian Pink. Dr. Smith mentions having had a plant from Mr. Sikes's, which seemed to be a mule between this and the first species.

There are varieties with red flowers, with purple flowers, with white flowers, with variegated flowers, each single and double, and imperial large-flowered.

The seventh species has the stem a foot or eighteen inches in height, procumbent at the base, and then erect, round, somewhat two-edged on the upper part, smooth, branching only at top: the leaves are like those of narrow-leaved Sweet-William, connate, lanceolate-linear or linear subulate, acute, quite entire, bright green, smooth, marked with lines and a rising nerve, rough on the edge, green not glaucous: the flowers are erect, usually two terminating each branch, on short peduncles; sometimes there are more, and sometimes only one: petals pale red, sometimes white, sprinkled with bloody spots: they smell very sweet, especially in the evening. It is supposed by some perennial, but by others biennial, or annual. It succeeds best in a calcareous soil. It is a native of Denmark, &c. flowering in July and the following month.

The varieties of pinks principally cultivated in the garden are as below, flowering in the following order.

The *Damask Pink*, which is the first of the double sorts in flower; it has but a short stalk; the flower is not very large, nor so double as in many others; the colour is of a pale purple, inclining to red. It is very sweet in its smell.

The *White Shock*, which is thus denominated from the whiteness of its flowers, and the borders of the petals being much jagged and fringed: the flower-stalks are eight or ten inches in height. Its scent is not so agreeable as in some other sorts.

The *Pheasant's Eye*, of which there are different varieties, and frequently new ones introduced, some of which have very large double flowers; those which burst their pods are the least esteemed. They have firm flower-stems, eight or ten inches high: the flowers large, whitish, or blush-coloured, with dark purple spots in the middle. That sort of Pheasant's Eye called *Bat's Pink* often flowers again in autumn.

The *Cob Pink*, the stalks of which are much taller than in those of the former sorts; twelve or fifteen inches high; the flowers very double, and of a bright red colour; it has the most agreeable odour of all the sorts; flowering from the latter end of May to the middle of July.

The *Old Man's Head Pink*, and the *Painted Lady*, flower in July, at the same time with the *Carnation*, to which they are more nearly allied than to the *Pink*. The first, when in its proper colours, is purple and white striped and spotted, but it is frequently of one plain colour, as purple: it continues flowering till the frost in autumn puts a stop to it, and the flower having an agreeable scent renders it valuable. The latter is chiefly admired for the liveliness of its colour; as it is not so sweet, or of so long continuance, as the other.

The *Clove Pink* has a large deep red flower, affording a strong scent of the *Clove*.

Martyn thinks it probable that the *Red Pinks* take their rise from the *Carnation*, whilst the *Pheasant's Eye Pinks* seem to derive their origin from the fourth. Some give them all as variations of the third; which is not, he conceives, likely.

There are single and double flowers of each of these sorts.

Culture.—Though the culture in these ornamental plants is effected without much difficulty, considerable attention is necessary in the management of some of the sorts, to have them flower in the utmost perfection and beauty.

Culture in the Sweet-William Kind.—The single sorts of these plants are readily increased by sowing seed which has been carefully collected in a bed of light earth, that has not been much enriched by manure, in the latter end of March or beginning of the following month, either over the surface or in slight drills, covering it in well: when the plants have attained a proper growth, as about the latter end of June, they should be removed and set out on other

small beds prepared for them, planting them out six or eight inches distant each way, watering them and keeping them perfectly free from weeds till the following autumn or spring, when they must be taken up with good balls of earth about their roots, and set out where they are to flower. It is by this method that new varieties are produced. Although these plants are perennial, they should be raised every year from seed, to have them blow strong and in perfection.

These and the double sorts may be continued by slips or layers. In the former mode the slips should be planted out either in the early autumn or spring months where they are to remain, giving them a little water at the time, when the weather is dry. When the slips are taken from the young plants, they should be made quite down to the roots, so as to have fibres to them. In this way the plants are often good and flower well. Cuttings or pipings managed in the same way also succeed well.

In the latter method the more tender branches should be laid down in the summer months, water being frequently given when the weather is hot and dry. After they have taken root perfectly they should be separated or taken off, and planted out where they are to remain, or in beds of light earth, to be afterwards removed, a little water being given at the time. A few of the best should be potted in the beginning of autumn, in order to be more conveniently removed under shelter during the severity of winter.

These plants should neither be kept too moist or dry, as in both situations they are liable to sustain much injury by the canker.

The seed for the culture of these plants should be collected, when perfectly ripened, from the best and most perfect flowers which have grown at a distance from any bad or inferior plants, and be kept in a dry situation.

Culture in the Gilliflower or Carnation Kind.—These plants may be raised with facility in the beds or borders of pleasure-grounds or gardens where the soil is moderately light and dry; but in order to have them in the greatest superiority and perfection, it is the practice of florists to employ a compost prepared by mixing the surface vegetable mould of old pastures with well rotted stable-dung from old hot-beds, or neat's dung in the same state and sea-sand, in the proportion of a third of the former and a fourth of the latter. These materials should be well blended, and lie for a considerable length of time, being frequently turned before they are made use of. This mould may be employed both for filling the pots with and for forming the beds; and in preparing it for these purposes it should not be sifted fine, but merely well broken down and reduced by the spade.

These flowers may be increased and new ones produced by seeds, which should be sown on beds formed of the above compost, or on the common borders of light fine mould, from about the middle of March to the same period in the following month, raking it in evenly to the depth of a quarter of an inch, giving slight waterings when necessary, to promote their vegetation. The fine sorts are likewise often sown in pots or boxes, in order that they may be readily placed so as to have only the morning sun when the season is hot and dry.

After the plants are come up they should be kept clear from weeds, and be watered occasionally, and about July, when the weather is moist, be taken up and pricked out in nursery-rows on beds three feet in width, setting them six inches distant, and watering them well at the time and afterwards till they have taken fresh root.

At the beginning of autumn, as about September, they will have attained a large growth, and require to be removed into other beds or situations for flowering, in which they should be set out in rows eight or nine inches distant each way. Some place them in the quincunx manner, as producing a better effect. In this situation they should be protected in severe weather during the winter by the application of mats upon hoops placed over the beds. The culture they require in these beds is merely that of keeping them free from weeds, occasionally stirring the earth between them by a hoe, and as their flower-stalks advance giving them the support of handsome sticks. They should remain in these situations till they flower, after which the singles should be taken out and made use of as there may be occasion, in order to afford full room for the double sorts, the finest and most perfect of which being made stage or principal flowers, and the others set out in the borders; the whole being increased as there may be necessity by layering both the first and succeeding years.

The layer method is that which is principally employed in increasing and continuing particular varieties, as being the most certain. For this purpose the radical leafy shoots proceeding from the crowns of the plants, when of six or eight inches growth, are the most proper. These should be laid down into the earth about the latter end of June or beginning of the following month. The work is performed by stripping off the leaves from the lower part of the shoot, cutting off a little of the top, and then fixing upon a strong joint about the middle, to slit it with a sharp knife nearly half way through in a slanting manner, so as nearly to reach the joint above, forming a sort of tongue on the under side of the shoot, removing the bark from the enlarged part or joint to promote the striking

root. The mould about the root of the plant should then be stirred, and fresh added where it is wanting, forming a slight drill or opening for the branch to be gently laid down into in a horizontal manner with the cut part in the earth, the top being left out and raised a little to keep the slit open, pegging the main part of the branch down by short hooked sticks, drawing the earth over the cut part. When this method has been practised on all the branches, a good watering should be given to settle the mould about them, and frequently repeated when the season is dry.

When the layers thus formed have stricken good roots, which is mostly the case in six or eight weeks, they should be taken off with the root-fibres as entire as possible, and after having the sticky parts about the bottom and the top leaves trimmed off, be planted out either in pots or beds, in the latter method at six or eight inches distance, with a dibble, a good watering being immediately given, and repeated every two days for ten days or a fortnight till the plants become well rooted. They should be removed from these beds with balls of earth about their roots in the beginning of the autumn into small pots, to have shelter during the winter, and in the early spring be placed in large ones for flowering; but when there is room, it is a better practice to plant them at once in the pots, as frequent transplanting injures their growth. Some florists, however, think it beneficial.

The less fine sorts may at the above season be planted out in the clumps, borders, or other parts, or be left in the beds for flowering.

These flowers may likewise be increased by cuttings or pipings in the manner directed below in raising pinks.

In the winter management of the plants, the fine potted sorts should about November be removed under the protection of a deep frame covered with glasses, and plunged closely together in a slight bed of old tan, dry sand, or earth. In this situation they should have a free admission of air when the weather is mild, but be covered in frost, and care should be taken that there be no stagnation of moisture, by the holes in the bottoms of the pots being obstructed.

The flowers in the beds should be covered by mats or other contrivances when the weather is severe at the same season.

In the spring their culture should be continued by removing those fine varieties planted out in small pots in the autumn into large ones for flowering, and such as have remained in the nursery-beds into the borders or large pots nine or ten inches over at top, to afford flowers, in each of which the business should be done by preserving balls of earth about their roots, about

the beginning of March or the following month. The work is performed by closing the holes in the bottoms of the pots with pieces of oyster shells or tiles, then filling them half way up with the earth prepared as above, placing the plants with their balls of earth in them, and filling up the vacancies on the sides with more fresh mould, closing it well up about the bodies of the plants so as they may stand nearly as high as the tops of the pots, giving a good watering at the time.

When the plants have been thus potted they should be placed in a sheltered sunny situation in the open air, being frequently refreshed with water in hot dry weather.

It is the practice with some florists to plant two flowers in a large pot; but it is better as well as more convenient for layering only to have one, the plants flowering stronger and making more free shoots.

In the summer treatment of the flowers the care of frequent watering should be continued when the weather is hot and droughty, and the surface mould be occasionally stirred to promote the growth and preserve neatness; and when the flower-stalks are a little advanced, handsome painted sticks should be placed for their support both in the pots and other situations, to which they should be neatly tied as they proceed in their growth. When they approach the period of flowering, the curious sorts should be removed to a stage constructed for the purpose, and provided with an awning to protect them from being injured by the scorching heat of the sun in the middle of the day, and the effects of too much wet, by which they are continued much longer in beauty.

Stages of this nature are formed in different methods, according to the fancy of the persons who make use of them. The following is a neat mode of constructing such apparatus: a platform is erected at the height of eighteen inches or two feet, constituted of two ranges of planks, in order to contain two rows of pots, sustained by posts in one or two rows underneath with an open-work roof five or six feet in height, covered by means of painted canvass, or some other suitable material, the whole being supported by upright posts, according to the taste of the proprietor.

The body of the stage should be neatly painted for the purpose of effect as well as preservation.

Instead of these stages some make use of a sort of caps or umbrellas formed of tin or other materials, supported on stems or sticks, one for each plant; but these are neither so convenient nor afford so good an effect as the former in displaying the beauties of the flowers.

But whatever contrivances are made use of for the protection and display of these curious flowers, the tying of the plants to the support-sticks should be continued as the stems advance; and some curious florists contrive to keep them erect at the tops by the use of fine wire or other similar means. And in order to procure the flowers as large and fine as possible, they trim off all the side-shoots from the stems, leaving only one or two of the top flower-buds to expand. When the flowers begin to open, care should be taken to prevent their bursting and expanding in an irregular manner, especially in the *burstlers*, by making a little opening or two in the indentings at the top at equal distances in other places, by means of fine small pointed scissars. The regular expansion of the flowers may likewise be much assisted, especially where one side is more expanded than the other, and they are in pots, by turning the pots, that the contrary sides may have the full influence of the sun.

Some florists likewise, to blow the curious sorts as broad and fine as possible, make use of a kind of spreading, stiff, white paper collar, cut open on one side and placed round the bottoms of the flowers to expand the petals upon to the utmost extent; but the practice is not in general advisable.

As these plants flower less perfectly as they increase in age, it is proper to provide fresh supplies of new varieties of them annually by sowing seed obtained from the best sorts in the spring season, as directed above, and likewise to continue the most valuable double varieties by means of layering in the summer months every year, or the planting of cuttings or pipings, but the first is by much the best mode.

In order to have good seed, some plants of the best and most curious sorts should be preserved distinct, and suffered to flower and ripen their seed in a perfect manner, which should then be taken off in the pods when the weather is dry, and, after being hardened a little, rubbed out and put up in a bag to be placed in a dry situation.

Culture in the Pink Kind.—All the species and varieties of these plants may be increased from seeds, and the perennial sorts likewise by layers, slips, cuttings, and pipings.

Where the best sorts only are grown, great care should be taken, in providing the seed, that it be always had from the best and most perfect kinds.

It should be sown in the manner directed for Carnations, in the beginning of March or the following month, and the plants be managed in a similar manner, only, as being more hardy in their nature, with less tenderness.

The sixth species is best increased by sowing the seed on a very gentle hot-bed the beginning of April, as the vegetation is thereby much for-

warded. When the plants appear air should be admitted freely, to prevent their drawing up weak, and when of a little growth they may be pricked out with good roots, if the weather be suitable, on a bed of light earth, at about three inches distance, proper shade and water being given. When they are of considerable growth, as about the latter end of May, they should be removed with good balls of earth about their roots, and planted where they are to remain for flowering.

The layers should be laid down in the latter end of July or beginning of the following month, in exactly the same manner as has been directed for Carnations, giving them the same culture in every respect.

Where there are large plants that spread considerably in a lateral manner, their shoots may be covered with earth in the spring to the depth of an inch or two; they will thus often take root, form good plants, and be in a state to be planted out in the beginning of the autumn.

The slips of the young shoots either made from the sides of the principal ones or from the roots, so as to have fibres to them, and planted out in February or the two following months in beds of good mould to a good depth, readily take root and become good plants before the end of the summer; at which time, or in the following spring, they may be removed with good balls of earth about their roots, to the places where they are to flower.

Cuttings made from the firm shoots of the same year at the joints, to the length of three or four inches, when planted pretty deeply in a bed of very fine mould, or in large pots at the distance of an inch or two, and well watered at the time, readily grow and become plants after being transplanted into separate pots, or the borders where they are to flower.

Pipings made by drawing out or breaking off the top parts of the young shoots at the joints and trimming them, by which a sort of pipe is formed, on being planted and managed in the same manner, take root and afford plants. See **PIPING FLOWERS**.

In both these last methods the rooting of the shoots is greatly promoted by their being closely covered by bell, hand, or other sorts of glasses, and having frequent slight waterings given round the sides of them.

The seed of the different best sorts should be collected in the pods in August or the following month when perfectly ripened, choosing a dry season for the purpose, spreading them out to harden and become dry on paper or in some other manner, after which it should be rubbed out and kept in some dry situation till it is wanted.

All the different species and varieties of these

plants are highly ornamental, and many of them curious, affording an extremely fragrant smell.

The first sort in all the varieties may be made use of in the borders, clumps, and other places, where they produce a fine effect by the variety of their flowers in assemblage with others of similar growth.

A few of the double more curious kinds may also be cultivated in pots for adorning the more conspicuous places about the house.

The second species and all the different varieties of the Carnation kind are proper ornamental plants for the fronts of clumps, borders, and other principal parts of gardens or ornamented grounds, where they have a very agreeable effect from the beauty and elegance of their flowers, as well as the fragrance which they afford.

The curious double sorts are mostly cultivated in pots for the convenience of protection, and being exhibited on stages or in particular situations during the time of their blowing, as well as for the ease and facility of removal when necessary.

The third sort and the different varieties of the common pink are well adapted for producing ornament in the fore parts of beds, borders, and other compartments of pleasure grounds and gardens, both from the multiplicity of their flowers and their beauty, as well as fragrant smell. These are sometimes used for edgings, but from their spreading growth they require frequent cutting in.

The fourth and fifth sorts may likewise be employed for the purpose of affording a greater variety.

The sixth species is very ornamental from the fineness of the colour of the flowers, and the great length of time which they continue in bloom.

It is observed by Martyn that the seventh species, from the elegance and delicious fragrance of its flowers, is deserving of being employed in all curious gardens.

In the planting out the various sorts, the annual kinds are mostly disposed in patches of three or four plants in each; but the perennial kinds singly, as being more bushy and spreading in their growth.

All the several species and varieties of these flowery plants may be brought to blow much more early by being cultivated in frames or the hot-house.

DIBBLE, an implement used for planting out various kinds of seeds, young plants, &c.

The best sorts are those made of the trees or handles of old spades, having the heads or top handles entire, twelve or fifteen inches, with the shank made gradually tapering to a point at the

lower end; and to make them more complete, they should be shod with a thin socket of iron seven or eight inches in length, made tapering to a point at bottom, as iron-shod dibbles make the holes much easier, cleaner, and more expeditiously than those wholly of wood, which are apt to clog with earth, and retard the business of planting.

These implements are proper for planting out most sorts of young plants, especially the fibrous-rooted kinds, and different sorts of cuttings, &c.

Besides these, blunt-pointed ones for planting large kinds of seeds and bulbous roots, such as broad beans, potatoes, large kinds of nuts, &c. and the bulbs of crocus, narcissus, tulips, and other bulbous roots, are necessary; which, by being rounded at the end, make the holes so as to admit them to the bottom; whereas the narrow-pointed ones form the holes deeper than is requisite, so as to leave a vacancy under the seed or root, in which water may stagnate and do injury, especially in winter: besides, when the seeds or roots go clean to the bottom, the growth of the plants is more effectually promoted. This implement in some places is termed *Dibber*.

DICTAMNUS, a genus affording a plant of the herbaceous hardy flowering perennial kind.

It belongs to the class and order *Dicandria Monogynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a five-leaved perianthium, very small, deciduous: leaflets oblong, acuminate: the corolla has five petals, oval-lanceolate, acuminate, with claws, unequal; of which two are bent upwards; two placed obliquely at the sides; one bent downwards: the stamina consist of ten subulate filaments, length of the corolla, situated between the two lateral declining petals, unequal: small point-like glands scattered over the filaments: anthers four-sided, rising upwards: the pistilum is a five-cornered germ, elevated from the receptacle: style simple, short, bent downwards, incurved: stigma sharp, rising upwards: the pericarpium has five capsules, conjoined inwardly at the border, compressed, acuminate, with distant tips, two-valved: the seeds in pairs, ovate, very smooth, within a common aril, which is two-valved, and cut down.

The species cultivated is *D. albus*, *Fraxinella*, or White Dittany.

It has a perennial root, striking deep into the ground, and the head annually increasing in size: the stalks many, two or three feet high, round, here and there slightly grooved, sometimes subcapitular, not branched, at bottom green and beset with white hairs, ferruginous-

red towards the top, with resinous glands: the leaves are alternate, the larger above a foot in length, spreading out horizontally, ascending towards the end; the midrib flat at top and edged on both sides, convex beneath and hairy; leaflets from two to five pairs, with an odd one at the end, most of them alternate, except the top pair or two, sessile or subsessile, except the end one, which is on a long winged petiole, smooth, stiff, oblique except the end one, ovate, acute, serrate, shining on both sides, about two inches long and an inch wide; the whole somewhat resembling an Ash leaf. The flowers in a long pyramidal loose spike or raceme, nine or ten inches long, of a purplish colour: the branches of the raceme alternate, with a bracte at the foot of each, one or two-flowered; there is also a short, lanceolate, hairy bracte to each pedicel. To each flower succeeds a fruit consisting of five compressed capsules, spreading out like the points of a star.

The whole plant, especially when gently rubbed, emits an odour like that of lemon-peel, but when bruised it has something of a balsamic scent. It is a native of Germany, flowering here at the end of May.

There are varieties with white flowers, with red and purple striped, and with short spikes of flowers.

Culture.—These plants may be increased by sowing the seeds in the beds, borders, or other parts of pleasure-grounds or gardens where the plants are to remain, in the beginning of the autumn soon after they become ripe, or in the spring; but the former is the best season, as the plants rise stronger and with more certainty. The plants should afterwards be kept perfectly clear from weeds, and have their stems cut down and cleared away every year in the autumn, as well as the earth dug round them in the early spring. Some, however, advise the roots of the plants in the first autumn to be taken up and planted out in small beds at six or eight inches distance each way, to stand two or three years till they are strong enough to flower, when they are to be carefully taken up in the autumn, and placed where they are to remain. They continue for a great length of time, and require little culture except that of being kept free from weeds, and trimmed as above in the autumn.

They are plants well suited to the middle parts of beds, borders, clumps, and other parts of ornamented grounds.

DIGGING, the operation by which garden ground is rendered fit for the reception of various sorts of crops. It should always be performed as near the time of putting in the seeds as possible, as in this state a new sort of fer-

mentation takes place, by which heat is not only evolved, but various other substances necessary for the purpose of healthy vegetation provided. But where the object is chiefly that of producing a fine mellowness in the mould, it may be performed at suitable leisure times in the autumn, being ridged or laid up so as to be exposed to the full influence of the winter frosts, and be in a proper condition for being levelled down and sown or planted upon in the early spring.

In bringing garden land into a suitable state for the reception of crops, it is an useful practice in some cases, especially where the sub-soil is of a good rich quality, to have it trenched over, paring off the surface, and turning it to the bottom, to be covered by the earth from below; but this should never be attempted except for tap-rooted crops, where the under soil is of a sterile unfriendly nature, as by such means the bed for the immediate reception of the seeds or plants must become very unfriendly to their growth, while the rich surface vegetable material will be placed out of their reach, and lost. This sort of work may be performed either in the autumn or spring months; but in the more heavy, adhesive soils it should always be performed when the weather is dry, as under other circumstances the mould is liable to become lumpy and uneven; and of course unfit for the putting in of crops.

In the execution of the first mode, or that of plain digging, the workman proceeds by beginning at one end of the piece of ground, forming a trench or opening quite across, to the depth which may be considered necessary, as from half a spit to a spit, according to the crop to be put in, and the same width, conveying the earth taken out to the opposite end, where the work is to finish; then proceeding with a second course across as before, turning the different spits in a clean, neat, even manner, into the former opening, continuing the same regular courses till the whole is dug over, breaking and reducing the lumps and clods as much as possible, being careful to preserve a level even surface, having a due regard to any hollows or depressions that may be present. The earth taken out from the first opening or trench will serve to fill up and render the last even and level; and when dung is applied, it may either be spread evenly over the surface, and regularly turned in, or placed in the hollow or trench, and covered by the digging of the following trench. This is much the best practice where the dung is of a rather littery nature. As the work advances, the roots of perennial weeds, such as twitch, bear-bind, and others of the same sort,

should be carefully picked out, as they multiply fast by being divided; and the surface-ones be well turned to the bottom.

In the latter, or trench method of digging, the usual practice is to begin at one end of the piece of ground, and form or open by a line and the spade a trench two spits wide, to the depth of one or two, removing the earth taken out to the contrary end, for the purpose of filling up the last trench; then to form a second trench in the same manner, after having pared off the surface, and placed it in the bottom of the former; proceeding in the same way till the whole is trenched over. In this mode it is usual to shovel up and take out the reduced mould or crumbs from the bottoms of the trenches in each course of digging. In executing the labour in this sort of digging, the workman stands with his side to the trench, while in the former case he faces it. This practice is particularly useful where the ground is much infested with weeds, and where the soil is stiff, or not of great depth. The dung in this way of digging, where it is made to the depth of only one spit, may be put in the bottom; but when two spades' depth are employed, it should be put in upon the first spit, after it has been dug off and placed in the bottom of the former trench or opening, as by this means it will not be buried to too great a depth, which would otherwise be the case.

The trench digging of garden ground may be performed either in a level surface, as in common digging, or in rough ridges: the first is the best method when immediate sowing is intended; but the latter in general where the land is to remain some time before it receives the crop, as in this way it will derive the greatest advantage from the influence of the atmosphere, and be more fully reduced, and rendered fine in the mould by being levelled down, when the sowing or planting is to be performed. But where the soils are of a thin, gravelly, or sandy nature, as they are liable to part with their moisture too freely, and do not stand much in need of pulverization, it would seem the best practice to constantly dig them in a plain or level surface, as by such means the effects of evaporation will be most effectually guarded against.

In general, all sorts of digging and levelling down, especially in the stiffer sorts of soil, should be executed when the ground is in a state somewhat inclining to dryness, as it can never be done to advantage when in a very moist or cloggy condition.

DIGITALIS, a genus comprising plants of the herbaceous hardy flowering biennial and perennial kinds.

It belongs to the class and order *Didymamia Angiosperma*, and ranks in the natural order of *Luridae*.

The characters are: that the calyx is a five-parted perianthium; divisions roundish, sharp, permanent; the superior longer than the rest: the corolla one-petalled, bell-form: tube large, expanding, bellied downwards; cylindric and close at the base; border small, four-cleft: upper division more expanding, emarginate; inferior division larger: the stamina consist of four subulate filaments, inserted into the base of the corolla, bent downwards, of which two are longer: anthers two-parted, acuminate on one side: the pistillum is an acuminate germ: style simple, in the situation of the stamens: stigma sharp: the pericarpium is an ovate capsule, length of the calyx, acuminate, two-celled, two-valved, valves bursting in two directions (partition double from the inflex edges of the valves): the seeds very many and small (subprismatic.)

The species cultivated are: 1. *D. purpurea*, Common Purple Fox Glove; 2. *D. thapsi*, Spanish Fox Glove; 3. *D. lutea*, Small Yellow Fox Glove; 4. *D. ambigua*, Greater Yellow Fox Glove; 5. *D. ferruginea*, Iron-coloured Fox Glove; 6. *D. Canariensis*, Shrubby Canary Fox Glove; 7. *D. Sceptum*, Shrubby Madeira Fox Glove.

The first has a biennial root: the stem is from three to six feet high, simple, upright, leafy, round, and pubescent: the leaves alternate, ovate-acute, serrate, veiny, wrinkled, underneath whitish with pubescence, gradually lessening to both ends; petioles short, and winged: the flowers in a long spike, nodding, imbricate, all directed the same way; of a purple colour. It is a native of Britain, &c. flowering from June to August.

The second species is perennial, but it seldom rises much above a foot and half in height, has much the appearance of the first: the leaves are tomentose, veined, serrate; the lower lanceolate-ovate, ten inches long and three broad, the upper broad-lanceolate, all decurrent and having the decurrent sides reflex: the bunch or spike of flowers is the same, but smaller. It is a native of Spain, flowering from June to August.

The third is perennial, has very long obtuse leaves near the root; the stalk is small, and rises from two to three feet high; the lower part of it has smooth leaves growing close together, about three inches long and one inch broad, ending in obtuse points: the upper part of the stalk for ten inches in length has small yellow flowers, closely ranged on one side of it, having a few very small acute leaves placed between them, situated on the opposite side of the stalk. It is

a native of France, &c. flowering in July and the following month.

The fourth species has long smooth-veined leaves at bottom: the stalk is strong, two feet and a half high: the leaves five inches long, one inch and a half broad, ending in acute points, having many longitudinal veins, and being slightly serrate: the upper part of the stalk is adorned with large yellow flowers, nearly of the same size with those of the first sort; the brim having acute points, and the upper lip being entire. It is a native of Germany; flowering at the same time with the third sort.

The fifth is perennial, having a strict stem, from three to even six feet high, branched at bottom: the leaves are sessile, lanceolate, even, marked with lines, quite entire: the flowers in an upright long spike or raceme from each of the upright axils, with small leaves between. They have the colour of rusty iron. It is a native of Italy, &c. flowering in June.

The sixth species has a shrubby stalk, four and sometimes five or six feet high, dividing into several branches: the leaves are lanceolate, rough, near five inches long, and two broad in the middle, gradually decreasing to both ends, having a few short serratures on their edges, placed alternately on the branches, each of which is terminated by a loose spike of flowers, near a foot in length, of an orange-colour intermixed with yellow. It is a native of the Canary Islands.

In the seventh, the branches are rough with hairs: the leaves approximating, near a foot in length, sessile, gradually dilated from the base into an oblong form, serrate in the middle, acuminate, smooth on the upper surface, rough with hairs and whitish on the lower: the peduncle terminating the branch, solitary, round, upright, a hand or more in length, porous on the inside, ending in an ovate spike with the flowers hanging down: the bractes before the flowers open from a coma. It is a handsome plant, and a native of Madeira; flowering in July and the following month.

Culture.—These plants may be increased, either by seeds or off-sets from the roots; the former is, however, in common the best method.

The seed for the herbaceous kinds should be sown, either in the autumn where the plants are to remain, or in the spring, in a bed or other place; and when the plants have attained a few inches growth, they should be removed either to the places where they are to flower, or into another bed to remain, to be finally planted out in the beginning of the autumn.

In the shrubby sorts it should be sown in pots of good mould in the early autumn,

and placed under the protection of a garden frame and glasses. When the plants have a few inches growth, they should be removed into separate pots of a small size, and put in the greenhouse for protection during the winter.

The first kind are well adapted to the large clumps and borders of pleasure-grounds, where they afford much variety and effect.

The latter sort are very ornamental in the greenhouse, from the length of time they continue in flower.

DIONÆA, a genus comprising a plant of the low herbaceous perennial exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Gruinales*.

The characters are: that the calyx is a five-leaved perianthium, upright; leaflets oblong, acute, permanent: the corolla has five petals, sessile, oblong, obtuse, concave: the stamina consist of ten filaments, subulate, shorter: anthers roundish, pollen trilocous: the pistillum is a roundish depressed germ, crenate: style filiform, shorter than the filaments: stigma spreading, fringed on the edge: the pericarpium is a one-celled, gibbous capsule: the seeds are very many, subovate, very small, affixed to the base of the capsule.

The species is: *D. muscipula*, Venus's Fly-Trap.

The root is squamous, sending forth but few fibres, like those of some bulbs, and perennial: the stalk about six inches high, round, smooth, without leaves, ending in a spike of flowers: the leaves are many, inclining to bend downwards, and placed in a circular order, jointed, succulent; the lower joint, which is a kind of stalk, is flat, longish, two-edged, and inclining to heart-shaped: the upper joint consists of two lobes, each semi-oval; the margins furnished with stiff hairs like the eye-lashes, embracing or locking into each other when they close: this they do when they are irritated within; the upper surface of these lobes is covered with small red glands, appearing, when highly magnified, like the fruit of the *Arbutus* compressed: among the glands, about the middle of each lobe, are three very small erect spines; when the lobes inclose any substance, they never open again while it continues there; if it can be shoved out so as not to strain the lobes, they expand again, but if force be used to open them, so strong has nature formed the spring of their fibres, that one of the lobes generally snaps off rather than yield: the flowers are milk-white, on peduncles. It is a native of Carolina; flowering in July.

Culture.—This is increased by sowing the seed obtained from its native situation, in pots of light moist mould, which should be plunged in a moderate hot-bed; and when the plants have

acquired some growth, they should be removed into separate small deep pots filled with bog earth, due water and shade being given till they become well rooted.

The plants afterwards require to be placed in a frame or greenhouse, so as to be protected from the full sun during the summer heat, and have a free air, with proper waterings; but in the beginning of autumn placed in the greenhouse, so as to be guarded from the effects of frost, being very moderately watered.

These plants are of the Sensitive kind, affording variety among other of the exotic greenhouse sort.

DIOSMA, a genus comprising plants of the low shrubby exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a five-leaved perianthium: leaflets ovate, acute, permanent: the corolla has five petals, ovate, obtuse, sessile, erect-spreading: nectaries five, placed on the germ: the stamina consist of five subulate filaments: anthers subovate, erect: the pistillum is a germ crowned with the nectary: style simple, length of the stamens: stigma obscure: the pericarpium consists of five capsules, ovate-acuminate, compressed, conjoined inwardly at the margin, distant at the tips, gaping at the upper suture: the seeds are solitary, oblong, ovate-depressed, acuminate at the point: an elastic aril, gaping on one side, involving each seed.

The species cultivated are: 1. *D. oppositifolia*, Opposite-leaved Diosma; 2. *D. hirsuta*, Hairy-leaved Diosma; 3. *D. rubra*, Red-flowered Diosma; 4. *D. ericoides*, Heath-like-Sweet-scented Diosma.

The first rises to the height of three feet: the branches are very long and slender, and are produced from the stem very irregularly: the leaves are placed cross-wise in pairs, and are pointed; every evening they close up to the branches: the flowers are produced along the branches from between the leaves; and in the evening, when they are expanded, and the leaves closely embrace the branches, the whole plant appears as if covered with spikes of white flowers. As it continues a long time in flower, it makes a fine appearance when intermixed with other exotics in the open air.

The second species forms a very handsome shrub, growing to the height of five or six feet: the stalks are woody, sending out many slender branches: the leaves come out alternately on every side: the flowers are in small clusters at the ends of the shoots; they are white, and succeeded by starry seed-vessels, having five corners, like those of the Starry Anise; each of these

corners is a cell (cocculus), containing one smooth, shining, oblong, black seed: these seed-vessels abound with resin, which afford a grateful scent, as does also the whole plant.

The third is a plant of humbler growth, seldom above three feet high, and spreads out into many branches; the leaves resembling those of heath: the flowers are in clusters at the ends of the branches, like those of the second sort, but smaller, and the bunches not so large, of a red colour.

The fourth is a low bushy shrub, which seldom rises above two feet high, but spreads out its branches far on every side; the leaves are narrow and smooth, of a light green colour, being ranged on each side the branches, appear flat on the upper and under side; when they are bruised, they emit a very strong penetrating odour: the flowers are produced singly from between the leaves; are white, and tinged on their upper surface. The Hottentots are said to use it to scent their ointments.

Culture.—These plants may be increased by planting the cuttings of the young shoots in the spring or summer months, in pots filled with good mould, plunging them in a moderate hot-bed. When the plants have stricken good root, they should be carefully taken up and placed out separately in pots, proper water and shade being given. They afterwards require to be protected in the green-house, and have the management of other shrubby exotic plants of similar growth.

These plants, from the beauty of their bloom and the fragrant smell that is emitted by many of them, are highly deserving of places in shrubby collections.

DIOSPYROS, a genus affording plants of the deciduous shrubby flowering exotic kind.

It belongs to the class and order *Polygamia Dioecia*, and ranks in the natural order of *Bicornes*.

The characters are: that in the hermaphrodite female the calyx is a one-leafed, four-cleft perianthium, large, obtuse, permanent: the corolla one-petalled, pitcher-shaped, larger, four-cleft; divisions sharp, spreading: the stamina consist of eight filaments, bristle-form, short, almost inserted into the receptacle: anthers oblong, unproductive: the pistillum is a roundish germ: style single, half four-cleft, permanent, longer than the stamens: stigmas obtuse, two-cleft: the pericarpium is a globose berry, large, eight-celled, sitting on a very large spreading calyx: the seed solitary, roundish, compressed, and very hard: male in a distinct plant: the calyx is a one-leafed, four-cleft perianthium, sharp, upright, small: the corolla one-petalled, pitcher-shaped, leathery, four-corner-

ed, four-cleft: divisions roundish, rolled back: the stamina consist of eight filaments, very short, inserted into the receptacle: anthers double, long, sharp: the interior shorter: the pistillum a rudiment of a germ.

The species cultivated are: 1. *D. Lotus*, European Date Plum; 2. *D. Virginiana*, American Date Plum.

The first rises with a tree-like stem to the height of six feet; the smaller branches spread a little, and are yellowish: the leaves oval-lanceolate, large, quite entire, paler underneath, somewhat hoary, with the veins somewhat hairy: the flowers are small, reddish-white, rotate: the fruit the size of a cherry, yellow when ripe, sweet with astringency. It is a native of Europe.

The second species rises here to the height of from fourteen to sixteen feet, commonly dividing into many irregular trunks near the ground: the wood is very hard, but brittle and somewhat white: the branches are many, and grow slender to the end, covered with a very thin greenish bark: the leaves many, broad, green, without dent or notch on the edges, so like the former, that it seems at first to be the same: it has a dark brown bark on the branches, but on the twigs it is grayish: the fruit is in form and bigness like a Date, very firm as that fruit, almost as sweet, with a great flat thick large kernel within. It is a native of Virginia and Carolina.

Culture.—The method of propagation in these plants is by sowing the seeds in a warm situation in the open ground in the spring; but it is better when done in pots or boxes filled with good earth, and plunged into a moderate hot-bed, as they rise more quickly, and advance with greater rapidity. When the plants have attained some growth, they should be gradually exposed to the open air until the autumn, when those in the full ground should be carefully protected from frost by mats or other means, and those in pots placed under a garden frame on moderate heat; free air being admitted when the weather is mild. Early in the following spring, they should be removed, and planted out in a warm situation in the nursery at proper distances, to remain two or more years; when they will be fit to be finally put where they are to remain.

These plants are proper for the large clumps, borders, and other parts of shrubberies, being sufficiently hardy when of proper growth to resist the effects of frost; where they have a good effect, not only from their flowers, but the shining green appearance of their leaves.

DIRCA, a genus containing a plant of the low deciduous hardy exotic kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Veroniceæ*.

The characters are: that there is no calyx: the corolla one-petalled, club-shaped; tube bell-shaped above: border obscure, with unequal margin: the stamens consist of eight capillary filaments, inserted into the middle of the tube, longer than the corolla: anthers roundish, upright: the pistillum is an ovate germ, with oblique tip: style filiform, longer than the stamens, crooked at the tip: stigma simple: the pericarpium is a one-celled berry: the seed single.

The species is *D. palustris*, Marsh Leather-wood.

It rises to the height of five or six feet in its native situation, but in Europe rarely more than half so high: it sends out many jointed branches near the root: the leaves are oval, pale yellowish, and smooth: the flowers come out from the side of the branches, two or three upon each peduncle; are of a greenish white colour, and appear early in the spring, when the leaves begin to shoot. It is a native of North America; flowering in March and the following month.

Culture.—This sort of plants is raised with difficulty in this climate, as they do not produce seeds, and can only be well effected by layers or cuttings of the young branches.

When the seeds can be procured from their native situation, they should be sown in the spring in a rather moist boggy situation, where the shrubs are to remain, as the plants never succeed where the soil is dry.

The layers or cuttings of the young shoots should be laid down or planted out in similar circumstances, during the spring and summer months; and when they have taken full root, be separated or removed, and planted in moist situations where they are to remain.

These plants can seldom be preserved, except in moist boggy places, in which they are rarely injured by cold.

DISANDRIA, a genus containing a plant of the trailing ornamental perennial kind.

It belongs to the class and order *Heptandria Monogynia*, and ranks in the natural order of *Pedicularæ*.

The characters are: that the calyx is a one-leafed perianthium, from five to eight-parted: divisions straightish; permanent: the corolla one-petalled, wheel-shaped: tube very short: border five-parted: divisions ovate: the stamens consist of from five to eight filaments, bristle-form, from erect becoming patulous, shorter than the corolla: anthers sagittate: the pistillum is an ovate germ: style filiform, length of the stamens: stigma simple: the pericarpium an ovate capsule,

length of the calyx, two-celled: seeds several, and ovate.

The species cultivated is *D. prostrata*, Trailing Disandra.

It has stems from a foot to two feet in height, prostrate, round, pubescent: the leaves are alternate, petioled, with about thirty notches, and pubescent: the peduncles axillary, usually two together, but sometimes one or three, erect, filiform, one-flowered, higher than the petioles: the flowers of a yellow colour. Martyn observes, "that the foliage greatly resembles that of Ground-ivy, and the branches trail on the ground somewhat in the same manner to the length of several feet." It is a native of Madeira; flowering most part of the summer.

Culture.—These plants may be easily increased by planting cuttings of the young shoots in pots filled with rich earth, which after they have taken root must be removed into separate pots, and be kept well watered during the hot season. They require the protection of the green-house during the winter, but in the summer they will bear the open air.

They produce an excellent effect when placed on high shelves, so that their branches may hang down over the sides of the pots in a loose manner.

DITTANY. See **DICTAMNUS**.

DODARTIA, a genus comprising a plant of the hardy perennial kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a one-leafed perianthium, bell-form, five-toothed, with ten corners; tubular, nearly equal, flat, permanent: the corolla one-petalled, ringent: tube cylindric, bent downwards, much longer than the calyx: upper lip small, emarginate, ascending: lower lip spreading, wider, three-cleft, twice longer, obtuse; middle division narrower: the stamens consist of four filaments, ascending towards the upper lip, and shorter than it: anthers small, roundish, twin: the pistillum is a roundish germ: style subulate, length of the corolla: stigma compressed, oblong, obtuse, two-cleft, the lamellas converging: the pericarpium a globose two-celled capsule: the seeds numerous, very small: receptacle convex, growing to the dissepiment.

The species cultivated is *D. orientalis*, Oriental Dodartia.

It has a perennial root, which creeps far under the surface, and sends out new stalks at a great distance from the parent plant; these are firm, a little compressed, and grow a foot and half high, putting out several side branches: the leaves are long, narrow, fleshy, opposite, of a

deep green colour; those on the lower part of the stalk shorter and broader than on the upper, on which they are entire; at these joints the flowers come out singly on each side the stalk, sitting close to it, are nearly an inch long, and of a deep purple colour; appearing in July. It is a native of the East; but rarely produces seeds here.

Culture.—These plants are readily increased by planting pieces of their creeping roots, either in the autumn, at the time when the stems decay, or in the spring before they shoot up; they succeed best in light dry soils.

It serves for ornamenting the borders and other parts of the garden or pleasure-ground.

DODECATHEON, a genus furnishing a plant of the low flowering perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Primula*.

The characters are: that the calyx is a many-leaved, many-flowered involucre, very small: perianthium one-leaved, half five-cleft, permanent: divisions reflex, finally longer, permanent: the corolla one-petalled, five-parted: tube shorter than the calyx: (naked at the throat) border reflex: divisions very long, lanceolate: the stamina consist of five filaments, very short, obtuse, seated on the tube: anthers sagittate, converging into a beak: the pistillum is a conic germ: style filiform, longer than the stamens: stigma obtuse: the pericarpium is an oblong, one-celled capsule, gaping at the tip: (subcylindric, opening into five parts): the seeds very many, and small: receptacle free, small.

The only species is *D. Meadia*, Virginian Cowslip, or Meadia.

It has a yellow perennial root, from which come out in the spring several long smooth leaves, near six inches long, and two and a half broad; at first standing erect, but afterwards spreading on the ground, especially when much exposed to the sun: from among these leaves arise two, three, or four flower-stalks, in proportion to the strength of the roots, which rise eight or nine inches high, smooth, naked, and terminated by an umbel of flowers, which are purple, inclining to a peach-blossom colour. It is native of Virginia, flowering about the end of April or beginning of the following month.

Culture.—The methods of propagation in this plant are either by seeds, or off-sets from the roots; but the last is the best.

In the first, the seeds should be sown either in the autumn, soon after they are fully ripened, or in the spring, in a moist shady spot, or in pots to be placed in such situations. When the plants

appear, they should be kept free from weeds, and have occasional water when the weather is dry, being shaded from the heat of the sun. When the stems decay, they may be carefully removed and planted in moist shady places, at the distance of twelve or eighteen inches, to remain till the following autumn, when they should be finally planted in the borders and other places where there are due shade and moisture.

The roots may be removed, and the off-sets carefully taken off from them about the latter end of August or the following month, and immediately planted in such situations as the above, when they will be fully established before the frosts set in.

These plants are found to be hardy, but incapable of succeeding in dry soils or sunny situations. They afford ornament in the beds, borders, or other parts of pleasure-grounds.

DODONÆA, a genus comprehending plants of the shrubby exotic kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Dumoseæ*.

The characters are: that the calyx is a four-leaved, flat perianthium; leaflets ovate, obtuse, concave, deciduous: there is no corolla: the stamina consist of eight very short filaments: anthers oblong, bowed, converging, length of the calyx: the pistillum is a three-sided germ, length of the calyx: style cylindric, three-furrowed, upright: stigma slightly three-cleft, a little acute: the pericarpium a three-furrowed capsule, inflated, three-celled, with large membranaceous corners: the seed in couples, and roundish.

The species are: 1. *D. viscosa*, Broad-leaved Dodonæa; 2. *D. angustifolia*, Narrow-leaved Dodonæa.

The first sends up several stalks from the root, about the size of a man's arm, with several upright branches, covered with a light brown bark, which frequently separates from the wood, and hangs loose: the leaves are stiff, varying greatly in shape and size, some being four inches long, and an inch and a half broad; others not three inches long, and a quarter of an inch broad; they are spear-shaped, entire, and of a light green, growing with their points upward, and have very short foot-stalks. The flowers are produced at the end of the branches in a sort of raceme, each standing upon a slender foot-stalk about an inch long. It is a native of the countries between the tropics.

The second species resembles the first, but the leaves are lanceolate-linear, and the fructification polygamious. It is a native of the Cape, flowering from May till the latter end of summer.



Painted by Syd. Edwards

London Published May 1850 by G. Kearsley Fleet Street

Engraved by E. Sanford

Dodecatheon Meaea
 1 *Meads Dodecatheon*

Dictamnus albus
 2 *White Trarinella*

Culture.—The propagation in these plants is effected by sowing the seeds obtained from abroad on a moderate hot-bed in the early spring. When the plants have attained a sufficient growth they should be removed into separate small pots filled with light loamy mould, and plunged into a bark hot-bed, due shade being given till they have stricken fresh root; after which, air should be admitted in proportion to the state of the weather, and slight portions of water. As the autumn approaches they should be placed in the stove, where there is only a moderate heat, and be sparingly supplied with water.

In the more advanced growth of the plants they may be placed abroad a few months in the summer season, in such situations as are warm and sheltered.

These plants afford variety among other stove plants, and were formerly supposed to be the tea-tree by some.

DOGBERRY-TREE. See *CORNUS*.

DOGWOOD. See *CORNUS*.

DORONICUM, a genus comprehending plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, with leaflets lance-subulate, about twenty in number, equal, upright, of a double series, length generally of the ray of the corolla: the corolla compound rayed: corollules hermaphrodite tubular, numerous, in the disk: females ligulate, of the number of calycular leaves, in the ray. Proper of the hermaphrodite funnel-form; border five-cleft, patulous: female ligulate, lanceolate, three-toothed: the stamens in the hermaphrodites have five capillary filaments, very short: anther cylindric, tubular: the pistillum in the hermaphrodites is an oblong germ: style filiform, length of the stamens: stigma emarginate: in the females, germ oblong: style filiform, length of the hermaphrodite: stigmas two, reflex: there is no pericarpium: calyx slightly converging: the seeds in the hermaphrodite solitary, obovate, furrowed, a little compressed: down hairy: in the females solitary, obovate, furrowed a little, and compressed: down none: the receptacle is naked and flat.

The species are: 1. *D. pardalianches*, Great Leopard's Bane; 2. *D. plantagineum*, Plantain-leaved Leopard's Bane; 3. *D. bellidistrum*, Daisy-leaved Leopard's Bane.

The first has thick fleshy roots, divided into many knots, sending out strong fleshy fibres, which penetrate deep into the ground. The root-leaves are heart-shaped, hairy, petioled: among these arise the flower-stalks, which are

channelled and hairy, near three feet high, putting out one or two smaller stalks from the side; these grow erect, and have one or two heart-shaped leaves closely embracing the stalk; this and each branch is terminated by one large yellow flower. It is a native of France, &c. flowering in May.

In the second species the leaves are indented on their edges towards their base; their upper parts are entire. The stalks rise about two feet high; each is terminated by a large yellow flower, like that of the first sort: they have two or three alternate, embracing leaves, not so hairy as those of the first species. It is a native of Germany, &c. flowering at the same time with the first.

The third has also a perennial root. The leaves are like those of the common daisy, but longer, and not so broad. The flower grows on a naked stalk near a foot long, and the root seldom sends out more than one stalk. It is of a white and yellow colour, and a native of the Swiss Alps, flowering in April.

Culture.—The methods of increasing these plants are either by sowing the seeds, or planting offsets of their spreading roots, in the spring or autumn, in shady spots of ground, either where the plants are to remain, or, in the former case, to be afterwards removed to them when they have attained some inches growth. The last sort is best increased by parting the roots, and succeeds most perfectly when the soil is moist and the situation shady.

All the sorts are well suited to the large borders, clumps, and other parts of extensive pleasure-grounds.

DRACÆNA, a genus containing plants of the herbaceous and tree-like kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx: the corolla has six petals, oblong, somewhat upright, equal, cohering by the claws: the stamens consist of six filaments, inserted into the claws, subulate, thicker in the middle, membranaceous at the base, length scarcely of the corolla: anthers oblong, incumbent: the pistillum is an ovate germ, six-striated: style filiform, length of the stamens: stigma three-cleft, obtuse: the pericarpium is an ovate berry, six-furrowed, three-celled: the seeds solitary, ovate-oblong, incurved at the tip.

The species are: 1. *D. Draco*, Dragon Tree; 2. *D. ferrea*, Purple Dracæna; 3. *D. ensifolia*, Sword-leaved Dracæna; 4. *D. marginata*, Aloe-leaved Dracæna; 5. *D. borcalis*, Oval-leaved Dracæna.

The first in its native situation rises with a thick trunk nearly equal in size the whole length; the inner part very pithy, next to this a circle of strong fibres, and the outside soft; height twelve or fourteen feet, nearly of the same diameter the whole length, which is rarely more than eight or ten inches; circular marks or rings are left the whole length, where the leaves have fallen off. The top sustains a large head of these, coming out singly all round it; they are shaped like those of the common Iris, but are much longer, being often four or five feet in length, and an inch and half broad at their base, where they embrace the trunk, lessening gradually and terminating in a point: these leaves are pliable, and hang down; are entire, of a deep green, smooth on both surfaces. It is a native of the East Indies, and called Dragon Tree, from the inspissated juice becoming a red powder, like the eastern Dragon's blood.

The second species has a shrubby stem, almost simple, eight feet high, erect, round, with close protuberant rings from the fallen leaves; these are quite entire, a foot and half in length, erect, smooth, on stem-clasping petioles, and of a dusky-red colour. The flowers are of a red-purple colour. It is a native of China, flowering in March and the following month.

The third has a perennial root, horizontal, creeping, somewhat woody, odoriferous, and simple. The root-leaves are heaped, thick, striated, shining, reflex, sword-shaped, a foot long. The scape three feet high, leafy at bottom, naked at top, round, slender, and declining; the flowers terminating, sub-umbelled, of a blue-and-white colour. It is a native of the East Indies.

The fourth species has purple-coloured spinous leaves, and the flowers in racemes. It is a native of Newfoundland, &c. flowering in June.

The fifth has the leaves elliptical, furrowed, and pointed, with spreading flowers. It is a native of New Zealand.

Culture.—These plants may be increased by sowing the seeds in pots filled with good rich earth, either in the spring or autumn, plunging them in the bark-bed of the stove. After the plants have attained some growth they may be removed into separate pots, and re-plunged in the hot-bed.

The last species is the only one capable of bearing the open air in this climate; all the others requiring to be kept constantly in the stove, where they should be moderately supplied with water.

They afford variety among stove collections, some of them being plants of singular growth.

DRACOCEPHALUM, a genus comprehending plants of the herbaceous, annual, and perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatae*.

The characters, are: that the calyx is a one-leafed perianthium, tubular, permanent, very short: the corolla one-petalled, ringent: tube length of the calyx: throat very large, oblong, inflated, gaping, a little compressed on the back: lip superior straight, arched, complicated, obtuse: lip inferior three-cleft; lateral divisions upright, as it were the segments of the throat; the intermediate one hanging down, small, prominent forwards at the base, roundish, emarginate: the stamina consist of four subulate filaments, hid beneath the upper lip of the corolla, of which two are a little shorter: anthers somewhat cordate: the pistillum is a four-parted germ: style filiform, in the situation of the stamens: stigma two-cleft, sharp, slender, reflex: there is no pericarpium: calyx cherishing the seeds in its bottom: the seeds four, ovate-oblong, three-sided.

The species chiefly cultivated are: 1. *D. Virginianum*, Virginian Dragon's Head; 2. *D. Canariense*, Canary Dragon's Head, or Balm of Gilead; 3. *D. Austriacum*, Austrian Dragon's Head; 4. *D. Ruyschiana*, Hyssop-leaved Dragon's Head; 5. *D. Moldavica*, Moldavian Dragon's Head, or Balm.

There are other species that deserve cultivation.

The first is a perennial plant. It rises with an upright stalk, near three feet high. The leaves are about three inches long, and half an inch broad, sessile; usually in pairs at each joint, but sometimes there are three together. The flowers are purple, in terminating spikes. It is a native of North America, flowering from July to September.

The second species is also a perennial plant, rising with several stalks to the height of three feet or more, becoming woody at the lower part; the leaves at each joint having three or five oblong, pointed, serrate leaflets.—The flowers come out in short thick spikes on the top of the stalks; they are of a pale blue colour. It is a native of the Canary Islands, flowering at the same time as the first.

The third has likewise a perennial root. The stalks are hairy, a foot and half high, sending out several side-branches. The leaves are hairy, linear, cut into three parts. The flowers terminating in short whorled spikes, with some very narrow leaves (bractes) under each whorl. It is a beautiful plant, growing naturally in Austria, &c.

In the fourth the root is perennial. The stems about two feet high, with two smooth linear leaves at each joint, about an inch long, and one-eighth of an inch broad, with a deep furrow along the middle: at each joint, at the other sides of the stem, come out two or three very narrow small leaves of the same shape. The flowers are in spikes, of a fine blue colour. It is a native of Norway, flowering in June.

The fifth is an annual plant, rising with branching stalks a foot and half high, with oblong leaves, deeply serrate on their edges. The flowers come out in whorls round the stalks at every joint; are blue, and appear in July, continuing to the middle of August. It has a strong balsamic odour, which to some is very agreeable. It is a native of Moldavia.

Culture.—These plants are raised in different methods, according to the kinds.

The first sort is best propagated by parting the roots and planting them out in moist, sheltered, shady situations, either in the autumn or spring.

In the second kind the plants are best raised by sowing the seeds in pots of good mould in the autumn, protecting them by means of a frame and glasses during the winter. When the plants have some growth they may be removed into separate pots, and placed in the open air during the summer, but brought under the shelter of a green-house or garden-frame in the winter; the latter is probably the better practice.

They may likewise be increased by planting cuttings of the young shoots in a warm shady spot during the summer. These, when they have formed good roots, should be removed into pots, to be protected under glasses during the winter.

They require a pretty full exposure to the air when the weather is suitable, being sufficiently hardy to stand the open air in mild winters.

The third and fourth species may be raised by sowing the seeds in the early spring months, in a bed of earth in an open exposure, or in pots. When the plants have attained sufficient growth they should be removed into a spot of fresh light earth, and planted out six inches apart, proper shade and water being given, till they become rooted, or into separate pots. If the pots be plunged in a moderate hot-bed it will greatly forward them.

They must be kept free from weeds till the autumn, in the first situation, when they should be taken up with good balls to their roots, and be planted out in the borders or other parts, where they are to remain. They may also be increased by planting cuttings of the branches in summer, in a shady spot, or in large pots, giving

them shade and water, and afterwards removing them into other pots.

The fifth species must be raised annually by sowing the seeds in patches, in the places where the plants are to remain, in the spring. When the plants appear, they should be properly thinned, and kept perfectly free from weeds.

All the sorts, except the second, may be employed for ornament in the beds or borders of gardens and pleasure-grounds; some of them affording a fine smell, as well as pretty effect in their flowers. They should be raised almost annually, in order to keep good plants.

The second kind is chiefly introduced among green-house collections, both for variety and the fragrant balsamic smell which it affords.

DRACONTIUM, a genus containing a plant of the climbing, evergreen, exotic kind.

It belongs to the class and order *Gynandria Polyandria*, and ranks in the natural order of *Piperitæ*.

The characters are: that the calyx is a spathe, boat-form, leathery, one-valved, very large: spadix extremely simple, cylindric, very short, coated on all sides with fructifications disposed into a head, of each of which the perianthium proper none, unless the corolla be so called: corolla proper five-petalled, concave: petals ovate, obtuse, somewhat equal, coloured; the stamina consist of seven filaments, linear, depressed, upright, equal, longer than the corolla: anthers four-cornered, twin, oblong, obtuse, upright: the pistillum is a somewhat ovate germ: style columnar, straight, length of the stamens: stigma obscure, three-sided: the pericarpium in each a roundish berry: the seeds very many.

The species cultivated is *D. pertusum*, Perforate-leaved Dragon.

It has slender jointed stalks, which put out roots at every joint, that fasten to the trunks of trees, walls, or any support which is near them, and thereby rise to the height of twenty-five or thirty feet: the leaves are placed alternately, standing upon long foot-stalks; are four or five inches long, and two and a half broad, having several oblong holes in each, so that at first they appear as if eaten by insects: the flowers are produced at the top of the stalk, which always swells to a larger size in that part than in any other; are covered with an oblong spatha (or hood) of a whitish green colour, which opens longitudinally on one side, and shows the spadix closely covered with flowers, of a pale yellow, inclining to white. It is a native of the West Indies.

Culture.—This plant is readily increased by planting cuttings of the young branches in pots

filled with light poor sandy earth, and plunging them in the bark-bed of the stove. When they have stricken root they should be removed, with balls of earth about their roots, into separate pots filled with poor earth, in order to check their rambling growth.

These plants, from the singularity of their leaves, and their being evergreen, afford variety in the stove, and at the same time serve to cover the walls of it by their climbing property.

DRAGON'S HEAD. See *DRACOCEPHALUM*.

DRAGON TREE. See *DRACÆNA*.

DRAWING-FRAME, a sort of deep hot-bed frame, or fixed glass-case, for placing particular sorts of curious, tender, annual flower plants in, for drawing them to a tall stature, such as cock's combs, tricolors, &c. by the assistance of a hot-bed.

Different sorts are occasionally adopted; some similar in form to common hot-bed frames, but four or five feet in depth, either moveable or fixed; others with different divisions to place one upon another; and some more spacious erections of glass-work, or, properly, glass-cases, which are in general more adapted for the business than the two first sorts.

These frames are mostly constructed of inch-and-half deal, and, in dimensions, generally the width and length of common large hot-bed frames for two or three lights.

In using such frames, the plants are first raised in a hot-bed under common frames and lights, pricked or planted singly into proper sized pots, in the same or another hot-bed; and after having advanced a foot or a little more in growth, so as to reach the glasses, a fresh hot-bed is made for the drawing-frame, which is placed thereon, and the bed earthed at top with light dry earth, or old tan; then the plants in their pots removed into it, plunging them to their rims in the earth, or other material, and the glasses put on; being afterwards managed as *Tender Annuals*.

Drawing-frames are at present much less in use than formerly, the plants being chiefly suffered to take their natural growth.

DRILL, a small narrow opening made in the ground by means of a hoe or other implement, for the reception of different sorts of seeds and roots, such as pease, beans, potatoes, and various kinds of small seeds, as well the nuts and stones of several sorts of trees, and the bulbous and tuberous roots of many plants of the flower kind.

Drills are generally formed by setting a line as tight as possible in the direction the crops are to be put in, and then with a common hoe held corner-ways, with the edge close to the line,

drawing the drill along it, from half an inch to five or six deep, as the different sorts of seeds and roots may require.

But drills, for some particular small seeds, may be drawn with a small or middling hoe flat-ways, or the edge downwards, in a horizontal position, so as to make a broad flat-bottomed drill; in that way forming a wider level bottom, with a larger space for the seeds, which admits of having them more evenly sown to an equal depth.

For seeds of tender plants which require the aid of hot-beds, as a hoe cannot be introduced, the ends of the two first fingers, or a short flat stick an inch or two broad, may be employed.

DRILL SOWING, the method of putting in crops by depositing the seed in drills: most sorts of crops that are cultivated in rows are put in to the greatest advantage in this way, as those of the pea, common bean, and kidney-bean kind, early potatoes, spinach, and beet, as well as parsley, coriander, and a variety of small seeds for the purpose of salad and other uses.

It is a mode of sowing which is particularly beneficial in affording the means of raising crops with regularity as well as of keeping the ground free from weeds, and earthing up the mould to the roots of the crops, by which their growth is greatly promoted; and likewise, which admits of the greatest convenience in gathering the various sorts of produce.

When the seeds or roots of any sort have been sown or planted in drills, the earth should be immediately drawn evenly over them, either with a hoe or rake, or the hand for the very small or more delicate sorts; but for the large kinds, such as pease, kidney-beans, broad-beans, &c. it may be turned in upon them expeditiously with the feet alternately, carefully covering all to an equal depth, trimming the top of each drill clear from stones and clods, so as to leave a perfectly smooth and even surface for the crops to come up in.

DUNG, a substance formed by passing through the bodies of animals, which is made use of in garden culture, both for the purpose of improving the soil, and that of affording a mild moist artificial heat, by which various sorts of delicate crops may be raised and produced at much earlier periods than could otherwise be the case.

In the intention of amending the condition of the ground, various sorts of dung may be made use of after being considerably reduced by undergoing the process of fermentation; but where the production of heat is the principal object, that of the stable kind must be chiefly

employed, while in its long or littery condition. See HOT-BED.

All sorts of animal dungs may be applied with advantage to soils of different sorts in the way of manure; but that of the stable kind is in general the most beneficial in the raising of garden crops; for which purpose it may often be used after it has been employed in hot-beds, and is considerably reduced. For some sorts of crops, as those of the potatoe, carrot, cabbage, brocoli, cale, and several other similar kinds, it may, however, be used with more benefit while in its littery unreduced condition, as by its gradually undergoing the process of decomposition within the earth, heat is not only evolved, but various other materials formed and set at liberty which greatly contribute to the growth and support of such crops; and at the same time the earth or mould preserved in a more loose state about their roots, by which they are more readily extended and enlarged. This last is a circumstance of great utility in potatoe, carrot, parsnip, and other similar tap and tuberous-rooted crops.

The nature and mode of application of these substances will be explained in another part of the work. See MANURE.

DWARF TREES, such trees of the fruit kind as are raised by grafting or budding stocks within a few inches of the ground, and which only form their heads to the height of a few feet, as from four or five to seven or eight, according to the kinds. It also comprehends such dwarf trees as are planted for espaliers, as well as those that are standards, though it is the latter that belong to this head.

Formerly, when trees of this sort were more attended to, they were trained in many different forms, from which they took their titles: thus, there were *Concave*, *Convex*, *Horizontal*, *Spiral*, and *Natural Dwarf Trees*, according as their heads were formed. In the forming of these trees, the method chiefly practised in the different sorts will be described in another place. See TRAINING OF FRUIT-TREES.

The kinds of fruit-trees most commonly employed in this way, are those of the apple, pear, plum, cherry, apricot, fig, and filbert kinds; but other sorts may be trained in the same manner.

To have good trees of these sorts, they should be grafted upon dwarf stocks, those of the apple on paradise stocks, and the pear kind on quince stocks. The former are, however, of

a shorter duration when raised on these stocks, than on those of the crab or apple kind.

The sorts of pears most adapted to this method are those of the summer or autumn fruited kinds, as the winter sorts never answer well in this method of management.

These kinds of fruit-trees should never be planted nearer together than fifteen or twenty feet, though Martyn, for those on paradise stocks, has mentioned six or eight; our Dutch stocks eighteen or twenty; and for those on crab or apple stocks twenty-five or thirty. The reasons why trees of this form are not in so much esteem for planting in gardens now as they were formerly, are, that of their being less advantageous in producing fruit from their form than those of the espalier kind; the ground being kept clear under them with more difficulty; their taking up too much room when grown to a large size; the air not circulating so freely about their stems, by which the fruit may be injured; the great difficulty of getting at the middle of the trees in the summer without displacing the fruit on the outside branches; and the greater destruction of the fruit-buds in consequence of the nature of their training. Mr. Forsyth, however, in his useful Treatise on the "Culture and Management of Fruit-Trees," recommends the planting of dwarf plum-trees in the kitchen garden as standards, in the middle of six-feet wide borders, at the distance of seventeen yards, training them up to have stems about three feet in height. And in the long narrow royal gardens at Kensington, which are much exposed to the winds, he has found two rows of apple-trees intermixed alternately with other fruit-trees planted on each side of the middle walk, which extends the whole length, at the distance of seventeen yards from each other; with others in two rows in the six-feet borders on the sides of the cross paths, at the distance of fourteen feet, to be highly beneficial in breaking the force of high winds; while the fruit can be conveniently gathered by a person standing on the ground. And as plums can be planted in the same manner with similar intentions; the quarters may be kept clear for culinary crops, and a free circulation of air admitted, which cannot be the case with espaliers. Besides, dwarf standards, which can be trained to any size, appear much better than espaliers, and at the same time afford a greater proportion of fruit.

EARTH, a substance constituted of various combinations of terrene materials. It forms the bed in which vegetables establish themselves and take their growth. The vegetable earth near the surface is in general the most fruitful and productive, as containing the largest proportions of vegetable and animal matters; the goodness of the inferior parts being estimated, as they approach or recede from it. For the purpose of perfect vegetation, it should neither be too stiff and adhesive, nor too light and porous, as in the former case the component particles are too close and compact to afford the roots of plants a sufficiently ready entrance to extend themselves and collect their nourishment; and in the latter, they are too loose and open to afford that stability and support to the plants which is necessary, as well as incapable of retaining a due degree of moisture for promoting their healthy growth.

Earth for the purpose of garden culture should therefore neither be of a too loamy or clayey, or too loose and sandy a quality; but of a rich, rather light, pliant nature, capable of being worked at all seasons without inconvenience, and of sufficient depth, as from one to two feet, to admit the roots of all sorts of plants and trees to extend themselves with facility.

The black vegetable, hazelly-brown, and chesnut-coloured loams are all proper for the purpose of garden ground. And many other sorts of earth that are of a more stiff and retentive nature may be made so by the application of such substances as are of a contrary quality. See SOIL.

EBENUS, a genus comprising a plant of the hoary, evergreen, flowery, exotic, shrubby kind, for the green-house.

It belongs to the class and order *Diadelphis Decandria*.

The characters are: that the calyx is a one-leaved, bell-shaped perianthium, terminated by five filiform teeth, which are villose, and nearly equal: the corolla is papilionaceous, length of the calyx: standard roundish, straight, entire: rudiments of wings obscure, crescent-shaped: keel crescent-shaped, gibbous, ascending at the tip: the stamina have diadelphous filaments, all growing together into a sheath, with tips distinct: anthers roundish: the pistillum, a roundish germ, villose: style capillary: stigma terminal, acuminate: the pericarpium is an ovate legume: the seed single, and rough with hairs.

The species cultivated is *E. Cretica*, Cretan Ebony.

It rises with a shrubby stalk three or four feet high, having several side branches. The leaves at each joint hoary, composed of five narrow lanceolate leaflets, which join at their tails to the foot-stalk, and spread out like the fingers of a hand. The branches are terminated by thick spikes of large purple flowers; from two to three inches long, making a fine appearance. It flowers in June and July, and in very warm seasons sometimes perfects seeds in this climate. It is a native of Crete.

Culture.—These plants may be increased by seeds, which should be sown in the autumn, in pots filled with light earth, and placed under a frame in the winter, to be protected from frosts.

When the plants come up in the spring, they should be kept clean from weeds, and be refreshed now and then with water. After they have acquired strength to be removed, they should be planted in separate small pots of the same earth, and plunged into a moderate hot-bed, just to promote their taking new root, then gradually inured to the open air, and removed in the latter end of May into a sheltered situation, to remain till autumn, when they should again be brought under shelter, as they will not live in the open air during the winter; but they must not be too tenderly treated, as they are apt to draw up weak. They should in winter be sparingly watered, but in summer often refreshed. They afford variety in the green-house.

ECHINOPS, a genus containing plants of the hardy, herbaceous, perennial and annual kinds.

It belongs to the class and order *Syngenesia Polygamia Segregata*, and ranks in the natural order of *Compositae Capitatae*.

The characters are: that the calyx is common, many-leaved, with scales subulate, totally reflected, containing many flowers: perianthium partial one-flowered, oblong, imbricate, cornered: leaflets subulate, loose above, upright, permanent: the corolla one-petalled, length of the calyx, tubular; border five-cleft, reflex, spreading: the stamina consist of five capillary filaments, very short: anthers cylindric, tubular, five-toothed: the pistillum is an oblong germ: style filiform, length of the corolla: stigma double, somewhat depressed, rolled back: there is no pericarpium: calyx unchanged, larger: the seed single, ovate-oblong, narrower at the base, with obtuse tip: the down obscure: the receptacle common globose and bristly.

The species cultivated are: 1. *E. sphaerocephalus*, Great Globe Thistle; 2. *E. ritro*, Small



Painted by Syd Edwards

London Published Aug^r 1866 by W. Kearley Fleet Street

Engraved by F. Cantlin

1 *Echinops sphaerocephalus*
Great Globe Thistle

2 *Eryngium alpinum*
Alpine Eryngo

Globe Thistle; 3. *E. strigosus*, Annual Globe Thistle.

The first has a perennial root. The stalks many, four or five feet high. The leaves long and jagged, divided into many segments almost to the midrib, the jags ending in spines; they are of a dark-green on their upper side, but woolly on their under. There are several globular heads of flowers on each stalk. The florets are commonly blue, but sometimes white. These come out in July, and the seeds ripen in August. It is a native of France, &c.

It varies with white flowers.

The second species has a perennial creeping root, sending up several strong stalks two feet high, and branching. The leaves cut into many fine segments to the midrib. Each branch is terminated by a globular head of flowers, smaller than those of the first, and of a deeper blue, but sometimes white: they come out in July. It is a native of the South of France.

It also varies with white flowers.

The third is an annual plant, with a stiff white stalk two feet high. The leaves divided, ending in many points, which have spines; their upper side green, covered with brown hairs, their under side white and woolly: the stalk is terminated by one large head of pale blue flowers, appearing in July. It is a native of France, &c.

Culture.—These plants are readily increased by sowing the seeds in the autumn in the places where the plants are to grow. When they are come up in the spring, they should be properly thinned and kept free from weeds. Some of the strongest plants may likewise be removed to other situations. In the third sort the seeds are better sown in the early spring.

They are well suited to afford variety in the large borders of gardens or pleasure-grounds, as they succeed in almost any soil.

EDGING, a range of small, dwarf, evergreen plants, as box, thrift, &c. closely planted on the side of borders or beds, for use and ornament.

They are particularly necessary to such borders as immediately verge walks or alleys of gravel, sand, shells, or other loose materials; to preserve the earth from being forced out upon them. They are likewise neat and useful as divisions in the flower-garden between the beds.

The first of these is the most effectual; easily kept in order, and the most durable; retaining its leaves and full verdure at all seasons, prospering in all soils and situations, being never hurt by any weather, and enduring many years close and regular, with the culture of merely clipping once or twice every summer at the top and sides.

The latter also grows very close, low, and is in verdure all the year; flowering beautifully two months in summer, but is apt to spread out of

bounds, requiring to be reduced by cutting in considerably on each side, or by replanting it afresh every two or three years. It is necessary to trim it a little with garden-shears on the sides and tops every summer as soon as it has done flowering, cutting off and removing all the withered flower-stalks, which is best performed during moist weather.

There are several other plants of low growth, such as daisies, pinks, chamomile, London-pride, catchfly, evergreen flowery perennials, that are sometimes employed as edgings, which have a pretty effect when in flower; but as in one year they spread greatly out of compass, they should be taken up and re-planted every spring or autumn, particularly the daisies.

Dwarf bushy annuals are also sometimes sown for summer edgings in small gardens, such as the dwarf virgin-stock, heart's-ease, candy-tuft, and several other low, bushy, annual flowers; but he first is the most suitable, as it grows low, bushy, and does not ramble; is very flowery, and continues long in bloom. Some sorts of shrubby aromatics are likewise used—as thyme, savory, hyssop, sage, lavender, and rue, all of which are evergreen, and may be kept low by close shearing; but then they are liable to become woody, stubbed, and naked.

Parsley is also a good evergreen edging for the edges of the quarters and borders of kitchen gardens: and strawberries are occasionally planted for this purpose; and where the runners in summer are kept trimmed in close, the plants have an agreeable appearance when in blossom and fruit.

In the planting or forming edgings—if box, the plants are generally placed in small, perpendicular trenches, close together, so as at once to form a complete edging. Thrift, daisies, pinks, &c. are commonly planted by dibble, at about two or three inches distance in the line, though, to form a compact edging at once, they may be planted so close as to touch each other. Pink-edgings may be formed by sowing the seed in a drill along the edge half an inch deep, suffering the plants to remain; and annual flower edgings are formed in the same manner: thyme, savory, and hyssop edgings may either be formed by sowing the seed, or by plants or slips; sage and lavender, chiefly by planting young slips; and rue in the same way, or by seed.

All the shrubby kinds of edgings should be neatly shorn or clipped with garden-shears, at the top and sides, every year in summer; and some sorts require it twice in that time, to preserve them perfectly neat, such as box.

These should never be suffered to exceed two or three inches in width, nor above three high; and those of thrift and the other herbaceous plants are not to get more than three or four

inches in width. The aromatic kinds, if in pleasure-grounds, should not exceed five or six inches in height, nor more than three or four in breadth.

In trimming box edgings, the top should be clipped along first in a level or even manner, then on the sides. Other low edgings should be cut and kept in a somewhat similar manner at top and sides, which, in those of the flowering kind, should generally be trimmed to regular order as soon as the flowers decay.

EDGING-IRON, an implement employed for cutting even the solid edges of grass-plats, lawns, &c.

In the blade it is made somewhat in the crescent form, or like a large cheese-knife, rounding below at the edge part, and with a socket above, upright in the middle, in which to fix a long straight handle of wood, three or four feet long. See **PLATE ON GARDEN IMPLEMENTS**.

In executing this work in straight edges, a line may be set as a guide to cut regularly even and straight by; but in curves, sweeps, or serpentine edges, the eye and a steady hand must be the guide: in both modes the edging-iron should be held obliquely or slanting flat-ways to the edge, cutting clean downward an inch or more deep, forming the edge even and upright; the cuttings being directly cleared away to the bottom.

It is likewise useful in new laid grass-plats, &c. which generally require the edges of the sward to be cut in even to their proper form and bounds, and which can be effected in this way to greater exactness than with a spade, and in a more even and regular method.

EDGING-SHEARS, an implement of the scissar kind, calculated for trimming the rough edges of grass-plats and lawns; being used only in cutting or clipping the projecting loose grass. See **PLATE ON GARDEN IMPLEMENTS**.

The most eligible kind for this purpose are such as are in the form of sheep-shearing shears, wholly of iron, formed with an elastic bow handle, without any wooden handle as in the common garden-shears: they may, however, be formed with long wooden handles, and be so contrived, as to clip the level surface as well as the edges: they are useful in the summer season when the grass grows out rough and irregular along the edges into the walks, &c. and requires to be trimmed in close and even occasionally, which may be expeditiously performed with these kind of shears, by being held with one hand, and run along the edges, cutting, as they proceed, the loose projecting grass close and even to the solid sward or green surface.

This work is also often effected with the point of common hedge-shears and a garden knife.

EHRETIA, a genus comprising plants of the exotic tree kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a one-leaved perianthium, bell-shaped, half five-cleft, obtuse, very small, permanent: the corolla one-petalled: tube longer than the calyx: border five-cleft: divisions somewhat ovate, flat: the stamina consist of five subulate, patulous filaments, length of the corolla: anthers roundish, incumbent: the pistillum is a roundish germ: style filiform, thicker above, length of the stamens: stigma obtuse, emarginate: the pericarpium a roundish one-celled berry: the seeds four, convex on one side, cornered on the other.

The species cultivated are: 1. *E. tinifolia*, Tinus-leaved Ehretia; 2. *E. bourreria*, Oval-leaved Ehretia; 3. *E. exsucca*, Dry-fruited Ehretia.

The first is an upright tree, in its native state from twenty to thirty feet high, with an oblong thick head: the branches unarmed, roundish, subdivided; the leaves alternate, veined, blunt, about four inches long, on short petioles: panicles terminating, oblong, large: the flowers terminating, numerous, white, and small, succeeded by a small berry. It is a native of Cuba.

In Jamaica it is known by the name of *Bastard Cherry-tree*.

The second species is a small inelegant tree, having an adust habit, fifteen feet high in some situations, in others seldom five: the trunk unequal, with a chinky bark: branches very many, irregular; the leaves alternate, petioled, quite entire, various; obtuse, acute or emarginate; smooth, on rocks, rugged in other places, differing in size; oblong, ovate: the flowers in corymbs, sweet, of a white colour. It is a native of the West Indies.

The third is a small tree fifteen feet in height; sometimes erect, sometimes supporting itself on other trees: the leaves are ovate, acute, very smooth, alternate, petioled, two inches long: the racemes branched, subcorymbd, subterminating: the flowers having a slight degree of sweetness, much larger than in the preceding ones, succeeded by green four-cornered berries. It is a native of Spain.

Culture.—These plants may be increased by sowing the seeds procured from abroad in the spring season, in pots of light earth, plunging them in a hot-bed. When the plants have attained proper growth, they should be removed into separate pots, and replunged in the bark-bed of the stove.

They are likewise capable of being propagated by laying down the young shoots in the spring; but in this way they are long in striking root.

They require the protection of a moderate stove during the autumn and winter, but when they have had some growth, they may be set out in the summer in the open air in hot weather.

They have a fine effect in their exuberant foliage among other stove plants, all the species affording much variety.

ELÆAGNUS, a genus containing plants of the shrubby deciduous kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Elæagnæ*.

The characters are: that the calyx is a one-leaved, four-cleft perianthium, superior, straight, bell-form, outwardly scabrous, inwardly coloured, deciduous: there is no corolla: the stamens consist of four filaments, very short, inserted into the calyx below the divisions: anthers oblong, incumbent: the pistillum is a roundish, inferior germ: style simple, a little shorter than the calyx: stigma simple: the pericarpium an ovate, obtuse drupe, smooth, with a dotted tip: the seed an oblong obtuse nut.

The species cultivated are: 1. *E. angustifolia*, Narrow-leaved Oleaster, or Wild Olive; 2. *E. orientalis*, Oriental Oleaster, or Wild Olive; 3. *E. latifolia*, Broad-leaved Oleaster, or Wild Olive.

The first is a tree branching from the bottom, growing sometimes to the height of three fathoms, with a trunk the thickness of a man's arm or thigh, elegant in its appearance, especially from the silvery brightness of the leaves: the bark is smooth, brown: wood pale, prettily veined with gray and brown, but not hard: the branches and branchlets slender, frequent, alternate, smooth, unarmed, or having thorns, especially in young trees: the leaves are petioled, in the more northern parts lanceolate, in the more southern broader, rather obtuse, and larger; silvery white underneath, on their upper surface hoary-greenish, and shining very much: the flowers come out at the middle leaves of the smaller branches, usually solitary or two together, sometimes, but very seldom, three from each axil, in which case one or two are on shorter peduncles and barren, succeeded by a solitary drupe, oblong, hoary-white when young, thicker and yellowish when ripe, inclosing within a sweet pulp a woody, gray, furrowed nut. It is a native of the South of Europe, &c.

Miller particularly distinguishes it from the thorny and unarmed narrow-leaved Oleaster: the latter he considers as that which is most commonly preserved in our gardens: the leaves in this are not more than two inches long, and about three quarters of an inch broad in the middle; are white, and have a soft cottony down on their surface; and at the footstalk of every leaf comes out a pretty long sharp thorn: the leaves

being alternate, the spines come out on each side of the branches: the flowers are small, and have a strong scent when fully open.

The second species, in the stature and manner of growth, is a tree that resembles a middle-sized willow, as also in the hoariness of its leaves and the division of its branches: the bark is gray, and cloven in the trunk: the small branches alternate, all white-tomentose: the leaves are alternate, oblong-ovate, and oval, quite entire, petioled, with a snowy hoariness underneath, and dotted-hoary on the upper surface, not shining, but soft. The wild sorts have sharp straight thorns scattered variously over the branches, which on the smaller twigs are hoary all over, and bear leaves: but the cultivated trees have no thorns: the flowers are alternate, peduncled, solitary, and extremely fragrant: the fruit ovate, very obscurely octangular, tomentose; the nut furrowed, having a cylindric kernel: it has much the appearance of the first, but is a native of Persia.

The third has a tuberous root, and rises with a woody stem to the height of eight or nine feet, dividing into many branches: the leaves are silvery, with several irregular dark-coloured spots; are alternate, and continue all the year: the flowers are lateral, white, on one-flowered peduncles, several together: the fruit small ovate, containing one seed. Native of the East Indies.

Miller remarks, that it is rare at present in our gardens.

Culture.—These plants may be increased either by seeds, layers, or cuttings; but the latter is the readiest and most common method.

The seed, when it can be procured, may be sown in pots of light earth in the spring, plunging them in the hot-bed; and, when the plants are of some growth, removing them into other pots or situations, where they may remain a year or two.

The layers and cuttings of the young shoots should be laid down or planted out in the autumn or early spring, those made from the tender sorts being put in pots, and placed in the hot-bed of the stove. When they are become well rooted, they may be removed, the hardy sorts into the nursery to have a few years' growth, and those of the tender kinds into separate pots, to have the protection of the green-house and stove.

These are all ornamental plants, the first sort being well adapted to afford variety in the clumps and borders of shrubberies, the second to the green-house, and the last to the stove. As the plants in the first sorts do not continue long, new ones should be raised every two or three years.

ELDER. See **SAMBUCUS**.

ELEPHANTOPUS, a genus comprising plants of the flowery, herbaceous, exotic kind.

It belongs to the class and order *Syngenesia Polygamia Segregata*, and ranks in the natural order of *Compositae Capitatae*.

The characters are: that the calyx is an involucre of three broad, sharp leaflets, many-flowered, large, permanent, without an umbel: perianthium partial, four-flowered, oblong, imbricate; scales lance-subulate, mucronate, upright, of which the four longer are equal: the corolla compound tubular: corollets hermaphrodite five or four, equal, disposed in a single circle. Proper one-petalled, tubular: border narrow, five-parted, nearly equal: the stamina consist of five capillary filaments, very short: anther cylindric, tubular: the pistillum is an ovate, crowned germ: style filiform, length of the stamens: stigmas two, slender, spreading: there is no pericarpium: calyx unchanged: the seeds solitary, compressed: down bristle-form: the receptacle is naked.

The species cultivated are: 1. *E. scaber*, Rough-leaved Elephant's Foot; 2. *E. tomentosus*, Woolly-leaved Elephant's Foot.

The first sends out from a perennial root many oblong rough leaves, which spread near the ground; between which, in the spring, arises a branching stalk, little more than a foot high: the side branches are short, and generally terminated by two heads of flowers, each on a short peduncle: the florets are of a pale purple colour. It is a native of the East and West Indies, flowering about the beginning of autumn.

The second species generally rises to the height of fifteen or twenty inches, sometimes more. The common receptacles of the flowers rise singly from the axils of the upper leaves, and seem disposed in the form of a spike, but there are seldom more than four florets in each. At first coming up it has many leaves, five inches long, and an inch and half broad where broadest; beginning very narrow, continuing so for two inches, and ending in a round point; are hard, smooth, dark green, and indented about the edges. From among these a round, strong, green stalk rises, four feet high, with an embracing leaf at each joint: it has branches towards the top, standing round at every joint, divided into others, which are beset with smaller leaves. From the axils of these come out the flowers, without any peduncle, standing in several green leaves; they are white, in bundles, without any involucre. It is a native of Jamaica, &c.

Culture.—These plants are capable of being increased by sowing the seed in the early spring on a moderate hot-bed, or in pots plunged in it. When the plants have attained a little growth,

they should be removed into pots filled with light fresh earth, and be re-plunged in the bark hot-bed, due shade and water being given, till they are fresh rooted, air and water being then freely afforded when the season is hot.

These plants require the protection of the green-house in winter, but may be placed abroad a little in the hot summer season.

They afford variety among other potted green-house plants.

ELM-TREE. See *ULMUS*.

EMPETRUM, a genus containing plants of the under-shrubby kind.

It belongs to the class and order *Dioecia Triandria*, and ranks in the natural order of *Ericae*.

The characters are: that in the male the calyx is a three-parted perianthium; divisions ovate, permanent: the corolla has three petals, ovate-oblong, narrower at the base, larger than the calyx, withering: the stamina consist of three capillary filaments, very long, hanging forwards: anthers upright, short, two-parted. In the female the calyx is a perianthium, as in the male: the pistillum is a superior germ, depressed: style scarce any: stigmas nine, reflex-expanding (styles three to nine): the pericarpium an orbiculate berry, depressed, one-celled, larger than the calyx: the seeds nine, jointedly placed in a circle, on one side bulging, on the other cornered (three to nine).

The species are: 1. *E. nigrum*, Black-berried Heath; 2. *E. album*, White-berried Heath.

The first is a small decumbent shrub; the outer bark deciduous, and of a brown colour, the inner yellow: branches rough with the remains of the petioles: the terminating bud consists of five membranaceous leaflets, hairy at the edge; this puts forth five little branches, of which four are in a whorl: the leaves are in fours, somewhat three-cornered, with a white linear keel, and petioled: the flowers axillary, sessile, and solitary: the berries brownish-black, when ripe; the size of juniper berries. It is a native of the north of Europe, flowering in April.

The second species differs from the above in having the smaller branches pubescent; the leaves longer, somewhat scabrous on their upper surface, and channelled underneath: the berry guarded at the base by a fleshy, white, shining calyx. It is a native of Portugal.

Culture.—These plants are capable of being raised from seed, slips, or offsets, and layers; but the best method is that of planting the young plants procured from the places where they grow naturally.

The seeds in the first sort may be sown in situations where the earth is boggy, and there is a degree of shade and moisture, in the open ground, in the spring season; but in the second

sort it must be sown in pots, and plunged in the hot-bed under glasses to bring them forward: in this way the plants grow slowly. The slips and layers may likewise be planted in the same situations, according to the different kinds, in the spring or summer season. The potted sort succeeds best when the pots are filled with boggy or peaty earth.

The first sort affords variety in the fronts of the borders and clumps of shrubberies, and the latter in the same situations in the green-house.

ENDIVE. See CICHORIUM.

EPHEDRA, a genus containing plants of the under-shrubby, evergreen kind.

It belongs to the class and order *Dioecia Monadelphia*, and ranks in the natural order of *Coniferae*.

The characters are: that in the male the calyx is a compounded ament of one-flowered scales, few, roundish, concave, length of the perianthium: the perianthium proper one-leaved, half-two-cleft, roundish, inflated, small, compressed; divisions obtuse: there is no corolla: the stamens consist of seven filaments, coalescing into a subulate pillar, divided at the tip, longer than the calyx: anthers roundish, turned outwards, of which four are interior; the other three superior. In the female the calyx is a five-fold perianthium, one placed on another, with alternate divisions, in an ovate figure; each one-leaved, somewhat ovate, two-parted; the exterior ones smaller: there is no corolla: the pistillum two ovate germs, size of the last perianthium, on which they are placed: styles simple, filiform, short: stigmas simple: there is no pericarpium: calycine scales all thickened, succulent, constituting a divided berry: the seeds two, ovate-sharp, on one side convex, on the other flat, compressed by the calyx covering them on every side.

The species cultivated are: 1. *E. distachya*, Great Shrubby Horse Tail, or Sea Grape; 2. *E. monostachya*, Small Shrubby Horse Tail.

The first has a low, under-shrubby stem, sometimes branching to the height of two feet, having various small joints, from which come off opposite narrow shoots, branching out into long rushy tufts, opening in the manner of leaves, for which they serve. It is a native of the south of Europe, flowering from June to July.

The second species rises with a low under-shrubby stalk to the height of not more than about a foot, sending off branches in a similar growth to the first. It is a native of Siberia, flowering from September to November.

Culture.—The propagation in these plants is easily effected by planting the offsets, taken from

their creeping roots in the early spring season, in a situation where the ground is rather stiff and moist. They were formerly cultivated in pots, but they are now found to answer better in the open air.

They afford variety in the small borders and clumps, by their singular growth and appearance.

EPIGÆA, a genus containing a plant of the low, trailing, flowery, shrubby kind.

It belongs to the class and order *Decandria Monogynia*; and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a double perianthium, approximated, permanent; exterior three-leaved; leaflets ovate-lanceolate, acuminate; the exterior large: interior five-parted, upright, a little longer than the exterior: leaflets lanceolate, acuminate: the corolla one-petalled, salver-form: tube cylindric, as long as the calyx or longer, hirsute within: border spreading, five-parted: lobes ovate-oblong: the stamens consist of ten filiform filaments, length of the tube, affixed to the base of the corolla: anthers oblong, sharp: the pistillum is a globose germ, villose: style filiform, length of the stamens: stigma obtuse, subquincunx: the pericarpium a subglobose capsule, depressed, five-cornered, five-celled, five-valved: the seeds very many and roundish: the receptacle large, and five-parted.

The species chiefly cultivated is *E. repens*, Creeping Epigæa, or Trailing Arbutus.

It is a low plant, with a trailing shrubby stalk, which puts out roots at the joints. The stalks are garnished with oblong rough leaves, waved on their edges. The flowers are produced at the end of the branches in loose bunches of a white colour, and divided at the top into five acute segments, which spread open in form of a star. It flowers in July, but does not produce fruit in this climate. It is a native of Virginia, &c.

Culture.—In this plant it is easily effected by its trailing stalks, which put out roots at the joints, and may be cut off from the old plant and planted in a shady situation, where the soil is moist, in autumn, that the plants may be well rooted before the spring. When the winter proves very severe, it is necessary to lay a few dried leaves, or other light covering, over them, to protect them from frost; and after they are well rooted they only require to be kept free from weeds.

These plants afford variety in the fronts of shrubberies, and other parts of ornamented grounds.

EPILOBIUM, a genus containing a plant of the herbaceous, flowery, perennial kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leaved perianthium, four-parted, superior; divisions oblong, acuminate, coloured, deciduous: the corolla has four roundish petals, outwardly wider, emarginate, expanding, inserted into the divisions of the calyx: the stamina consist of eight subulate filaments; the alternate ones shorter: anthers oval, compressed, obtuse: the pistillum is a cylindric germ, extremely long, inferior: style filiform: stigma four-cleft, thick, obtuse, rolled back: the pericarpium is an extremely long capsule, cylindric, streaked, four-celled, four-valved: the seeds numerous, oblong, crowned with down: receptacle extremely long, four-cornered, free, flexible, and coloured.

The species cultivated is *E. angustifolium*, Narrow-leaved or Rose-bay Willow-herb.

It has a creeping root. The stem is upright, from three to six feet high, branched at top, round, and pubescent; the branches alternate. The leaves alternate, running slightly down the stem, smooth, the edge minutely and rarely indented, the midrib whitish: the lateral nerves are nearly at right angles with this; and the leaves at their first appearance are rolled in at the edge. The flowers are purple, showy, growing in a kind of long spike, on purple peduncles, the length of the germ, bending down before the flowers open, but afterwards erect; seldom more than four or five blown together on the same spike. From the great similitude of the leaves to those of willow, it has obtained the name of Willow-herb, or French Willow.

There is a variety with white flowers.

Culture.—It is readily increased by dividing its creeping roots, and planting portions of them out in moist shady situations where they are to remain, in either the autumn or early spring. The plants may also be raised by sowing the seeds in the same situations. The plants afterwards require only to be kept within proper limits.

They are well suited to shady situations, and for covering rock-work.

EPIMEDIUM, a genus containing a plant of the low, herbaceous, flowery, perennial kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Corydales*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate, obtuse, concave, expanding, small, placed directly (not alternately) below the petals, caducous (with a single bracte at the base of two of them): the corolla has four petals, obtuse, concave, expand-

ing: nectaries four, cup form, (slipper-form,) with obtuse bottoms, of the size of the petals, and leaning on them, affixed by the edge of the mouth to the receptacle: the stamina consist of four subulate filaments, pressing on the style: anthers oblong, erect, two-celled, two-valved, gaping from the base towards the tip, with a free dissepiment: the pistillum is an oblong germ: style shorter than the germ, length of the stamens: stigma simple: the pericarpium is an oblong silique, acuminate, one-celled, two-valved: the seeds very many, and oblong.

The species is *E. alpinum*, Alpine Barrenwort.

It has a creeping root, from which arise many stiff smooth stalks, about nine inches high, cylindric, simple, near the root surrounded with scales, at top trichotomous. The leaves once and twice ternate, pendulous, heart-shaped, ending in a point, serrate; the serratures ending in a hair, pale green on the upper side, gray on the under. The raceme a finger's length, naked, loose, lateral, with three or four branchlets, usually two-flowered, supported by a rufous bracte. It is a native of the Alps, flowering in April and May.

Culture.—It is readily increased, by planting portions of its creeping roots in moist shady situations in the autumn or spring. It afterwards requires to be re-trenched, to keep it from injuring other plants.

It affords ornament and variety in the borders, by its singular growth.

ERICA, a genus comprehending plants of the evergreen, flowery, shrubby kind; mostly exotics.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate-oblong, permanent: the corolla one-petalled, bell-form, four-cleft, often bellied: the stamina consist of eight filaments, capillary, inserted into the receptacle: anthers two-cleft at the tip: the pistillum is a roundish, superior germ: style filiform, upright, longer than the stamens: stigma crowned, four-cornered, four-cleft: the pericarpium is a roundish capsule, smaller than the calyx, covered, four-celled, four-valved; partitions meeting with the sutures (opposite to the sutures): the seeds numerous and very small.

The species most in cultivation, according to Martyn, are: 1. *E. Tetralix*, Cross-leaved Heath; 2. *E. cinerea*, Fine-leaved Heath; 3. *E. didyma*, Double-anthered Heath; 4. *E. arborea*, Tree Heath; 5. *E. Australis*, Spanish Heath; 6. *E. multiflora*, Many-flowered Heath; 7. *E. Me-*



Painted by A. Edwards

London Published Nov 1st 1805 by G. Kearsley Fleet Street

Engraved by F. Stodart

Erica grandiflora
Great flower'd Heath

Epilobium angustifolium
Rose bay Willow herb

Digitized by Google

diterranea, Mediterranean Heath; 8. *E. lutea*, Yellow Heath; 9. *E. halimifolia*, Purple-stalked Heath; 10. *E. monsoniana*, Bladder-flowered Heath; 11. *E. mucosa*, Mucous Heath; 12. *E. urceolaris*, Hairy-flowered Heath; 13. *E. marifolia*, Marum-leaved Heath; 14. *E. cruenta*, Bloody-flowered Heath; 15. *E. ramentacea*, Slender-branched Heath; 16. *E. persoluta*, Blush-flowered Heath; 17. *E. triflora*, Three-flowered Heath; 18. *E. baccans*, Arbutus-flowered Heath; 19. *E. corifolia*, Slender-twigged Heath; 20. *E. empetrifolia*, Crow Berry-leaved Heath; 21. *E. capitata*, Woolly Heath; 22. *E. tubiflora*, Tube-flowered Heath; 23. *E. conspicua*, Long-tubed Yellow Heath; 24. *E. cerinthoides*, Honeywort-flowered Heath; 25. *E. comosa*, Tufted-flowered Heath; 26. *E. massoni*, Tall Downy Heath; 27. *E. Plukenetii*, Smooth-twigged Pencil-flowered Heath; 28. *E. Petiveri*, Downy-twigged Pencil-flowered Heath; 29. *E. herbacea*, Early-flowered Dwarf Heath; 30. *E. grandiflora*, Great-flowered Heath.

There are many other species equally deserving of cultivation.

The first has shrubby stems, from nine to twelve inches high, branched, brown, somewhat rugged from the remains of the leaves which have fallen off: branches a little woolly: the leaves are commonly in fours, but sometimes in fives, ovate-linear, spreading, near the flowers pressed close to the stem, the edges turned in and ciliated, each hair terminating in a small round gland; the upper surface is flat, the lower concave and white: flowers hanging down one over another all one way. It is a native of the northern parts of Europe, flowering in July and August; but according to Linnæus, twice in the year.

It is not inferior to many of the foreign heaths in the beauty and delicacy of its flowers. This is distinguished from the other British heaths, not only by the flowers growing in a kind of pendulous cluster on the tops of the stalks, but by the leaves growing in fours, and forming a sort of cross.

The second species has a perennial woody root: the stems shrubby, about a foot high, with opposite branches: the bark ash-coloured: the leaves are linear, fleshy, spreading; above smooth and shining, transversely wrinkled; towards the end beset with a few scattered hair-like points; beneath having a longitudinal furrow, which is white from a woolliness apparent to the magnifier; the edge somewhat membranaceous, and when viewed with the microscope appearing serrulate: the leaves, when young, have three flat sides, but when full grown are nearly flat: the flowers are in long clustered whorls terminating

in spikes, of a deep purple colour, sonorous when struck; they come out from the sides of the young shoots; those from the end-shoots being near each other, but scattered and bare; those from the small lateral branches generally in pairs. It is a native of the middle parts of Europe, flowering from June to August.

The third has twisted, trailing stems: the branches between scored and angular, light reddish brown; the more slender shoots ash-coloured, all lateral, to seven or more rising from the same point in the manner of an umbel; when beginning to flower, gradually tapering towards the end: the leaves are linear, somewhat like those of fir, bowed sideways, smooth, but not glossy, somewhat pointed, when magnified appearing to have distant serratures on the edge, which is bent in; upper surface green, slightly elevated in the middle; under whitish, convex, with a smooth furrow running along it, longer, and sometimes thrice as long as the corolla, and crowded so close as to conceal the younger shoots: the flowers roundish, on long slender peduncles, from the sides of the branches, beginning from below the middle, and extending to the ends, continuing on, in the cultivated plants, till the next season. It is a native of Britain.

The fourth species is an upright shrub, growing to the height of six feet, with upright branches covered with a white nap: the leaves are very abundant, upright, smooth, almost awl-shaped, covering the branches, wrinkled when dry: the flowers very numerous, on the middle of the branches, so that the later leaves are above them; they are on branching peduncles, forming a panicle. It is a native of the South of Europe, flowering from February to May.

The fifth is an upright rigid shrub, with an ash-coloured bark: the leaves are in threes or fours, linear, obtuse, somewhat rugged on the edge: the flowers terminating, two or three, subsessile. It is a native of Spain, flowering in April and May.

The sixth species has the stem the height of a man: the leaves are in fours or fives, spreading, obtuse, gibbous at the base: the flowers purplish. It is a native of the South of Europe, flowering from June to November.

The seventh has the branches whitish, and angular: the leaves are in fours, seldom in fives, and even: the flowers lateral, and of a purple colour, simple, coloured, lanceolate, acute, shorter by half than the corolla: style twice as long as the corolla: stigma entirely simple: it resembles the *multiflora*, but the corolla is absolutely ovate; the branches angular and white. It is a native of the South of Europe, flowering from March to May.

In the eighth species the stem is subdivided into narrow branches: the leaves pressed close, almost imbricate, opposite, blunt, grooved underneath, a line in length: the flowers are on the extreme branchlets, one, two, or three together, and upright, of a yellow colour. The whole plant being covered with shining golden or silvery flowers is very beautiful and ornamental. It is a native of the Cape of Good Hope. It varies with yellow or white flowers.

The ninth is a lofty shrub with purplish branches: the branchlets subtomentose and white: the leaves crowded very much, even, rugged about the edge.

But according to Thunberg, the stem is smooth, rugged, brown, flexuose, decumbent, strict, a span high: the branches alternate, divaricate, like the stem: the leaves in threes, lanceolate, acute, smooth, flat above, convex beneath, with a slender groove, spreading. It is a native of the Cape of Good Hope, flowering in May and June. It is distinguished from the other sorts by the size of the flowers.

In the tenth the stem is erect, pubescent leafless, two feet high: the branches scattered, frequent, spreading, covered with leaves, very short, simple: the leaves in threes, ovate, obtuse, convex beneath, with a longitudinal groove, flat above, entire, imbricate, smooth, scarcely a line in length: the flowers solitary, nodding, on pubescent reflex peduncles large and white. It is a native of Africa. This is one of the most beautiful plants of this beautiful genus.

The eleventh species has a frutescent stem, determinately branched, with white, awl-shaped, decurrent lines under the scars of the leaves; which are linear, even, pressed close, scarcely longer than the interstices: the flowers terminating, subumbelled, on peduncles the length of the flowers. It is a native of the Cape of Good Hope.

In the twelfth the stem is flexuose-erect, ash-coloured, two feet high: the branches opposite, or in threes, cinereous-villose, wand-like: branchlets filiform, scattered, frequent, wand-like: the leaves are in threes, linear-lanceolate; beneath grooved from the revolute margins, tomentose-whitish, from erect spreading, curved a little: the flowers flesh-coloured. It is a native of the Cape of Good Hope, flowering in May and June.

It varies with flowers very hirsute and hairy, red, and whitish flesh-coloured.

The thirteenth species has the leaves three-fold oval, downy-white underneath: the flowers ovate, conic. It is a native of the Cape of Good Hope.

In the fourteenth the branches are round and

smooth; branchlets pubescent: the leaves linear-awl-shaped, grooved, spreading, half an inch long, on appressed petioles scarcely half a line in length: the flowers axillary, and of a deep red colour. It is a native of the Cape, flowering at various seasons.

The fifteenth species has the branches filiform, ramentaceous, long, ferruginous: the leaves very narrow, upright, pressed close: the flowers umbelled, of a purple colour. It is a native of the Cape of Good Hope, flowering in July.

The sixteenth has the stem shrubby, smoothish, with pubescent branches: the leaves linear, obtuse, erect, channelled underneath, the length of the joints, hispid or subscabrous: the flowers are umbelled, dispersed on the upper twigs, and of a flesh-colour. It is a native of the Cape, flowering from February to May.

The seventeenth has a brown stem, smooth below, hispid at top, erect, a foot high: the branches dichotomous, brown at bottom, and smooth, above ash-coloured, hirsute, erect, fastigate: branchlets scattered all over the branches, filiform, frequent, hairy-rough, wand-like: the leaves are linear-subulate, entire, smooth, flat above, convex beneath, with a very slender groove, incurved, from erect spreading: the flowers solitary, or two or three together, on very short drooping peduncles, ash-coloured, tomentose. It is a native of the Cape.

The eighteenth species has an erect stem, branched: the leaves linear, bluntish, rugged on the edge, longer than the internodes, on white petioles: the flowers terminating, in threes, or thereabouts, nodding, the size of a pea, on purple peduncles, with alternate, remote, flesh-coloured bracts. It is a native of the Cape, flowering in April and May.

The nineteenth has a shrubby, compound stem: the leaves linear, smooth: the flowers terminating, sessile, of a purple colour. It is a native of the Cape, flowering in August.

The twentieth species has a brown, rugged stem, a foot high: the branches in whorls, like the stem, flexuose-erect: branchlets trichotomous and dichotomous, like the branches: the leaves in sixes, oblong, obtuse, incurved, above three-cornered, flat, beneath grooved, rugged, especially underneath, very finely ciliate, imbricate, a line in length: the flowers aggregate, in whorls, in the middle and at the ends of the branchlets of a blood-red colour. It flowers in April and May.

The twenty-first species has the stem seldom erect, commonly decumbent, smooth, flexuose, filiform: the branches filiform, flexuose, villose: branchlets capillary, frequent, tomentose: the leaves ovate, spreading, rough, with long hairs:

the flowers at the ends of the extreme branchlets, peduncled, one, two, or three together, the whole calyxes covered close with a white wool.

The twenty-second has the leaves linear, even the upper ones, ciliate: the flowers terminating, solitary, sessile, of a purple colour.

The twenty-third species has the leaves four-fold, smooth, and long yellow flowers. It flowers from May to August.

The twenty-fourth has the branches compound: the leaves oblong, convex, even, grooved underneath, ciliate, with spinules: the flowers large, heaped on the side into a sort of head, sessile, pubescent: calyx rough, with white hairs, as it were doubled: the corolla bright blood red, rough with white hairs, having the mouth obscurely four-cleft. It is a native of the Cape, flowering most part of the year.

The twenty-fifth species has the branches heaped above the flowers: the leaves linear, bluntish, erect: the flowers heaped, lateral, below the top of the stalk. It is a native of the Cape.

The twenty-sixth species has shrubby filiform stems, covered all round with leaves: the leaves in fours, imbricate in eight rows, very short, elliptic, crowded, obtuse, ciliate, so that they appear villose: the flowers red, in a terminating sessile head. It is native of the Cape.

The twenty-seventh has the leaves linear and crowded: the flowers peduncled, and nodding. It is a native of the Cape.

The twenty-eighth species is a brown shrub: the branches covered with branchlets in threes, crowded, very short, pubescent, clothed with squarrose leaves; which are also crowded, awl-shaped, subtrigonal, somewhat rugged at the edge, patulous, or standing out at the tip: the flowers solitary, at the ends of the branchlets, drooping, on a short, pubescent peduncle, of a red colour. It is native of the Cape, flowering from January to March.

The twentieth species is a small shrub, from a foot to eighteen inches in height, decumbent at bottom, then upright, branched, flexible: the leaves are almost covering the whole stem, deciduous, resembling those of the fir, thickish, having a prominent nerve, narrow, very sharp, smooth: the flowers at the tops of the branchlets, on short peduncles, alternate, among the leaves: they come out in autumn, continue closed during winter, and are then green; in May the year following the flowers are unfolded; the anthers which were inclosed are protruded, the calyx and corolla, opening, are both changed into a pale purple or flesh-colour. It is a native of Austria.

The thirtieth species has the leaves linear, four-fold: the flowers large and yellow. It is a native of the Cape, flowering from May to July.

Culture.—These elegant plants must be treated in different methods, according to their nature.

The first three British sorts are capable of being propagated by sowing the seeds, either in the places where they are to remain, or in pots filled with peaty earth in either the autumn or spring seasons, but this is a tedious practice. The best method is, to take them up from the places where they grow naturally in the early autumn, with good balls of earth about their roots, planting them again immediately where they are to grow.

They succeed best where the soil is of the peaty or moory kind, and where it has not been enriched by manure; and as they protrude their roots chiefly near the surface, it should be as little dug about them as possible.

The four following sorts may be increased in the same manner as the former; but the best practice is by layers, cuttings, or slips, which should be laid down or planted out in pots filled with boggy earth, either in the early spring or the latter end of summer, plunging them in a moderate hot-bed, giving them proper shade and water. When they have taken full root, they should be removed with balls of earth about them into separate pots, being replaced in the hot-bed till they become well established, when they will be capable of bearing the open air in mild weather.

All the other species may be increased either by cuttings or layers, but most of them by the former. The cuttings should be made from the best young shoots, and be planted in the spring season in pots filled with a composition of light boggy and loamy earth, being placed in the hot-bed, and covered with bell-glasses, and duly shaded from the sun, slight waterings being given when necessary; the layers are best made in the autumn, being managed in the same way.

When the plants are perfectly rooted, they may be removed into separate pots filled with the same sort of earth, and placed in the dry, stove or green-house, where many of the plants must constantly be kept.

The ninth, twentieth, and twenty-sixth species must, however, be raised by layers, as they have not yet been increased by planting their cuttings.

When seeds are made use of in producing these plants, they should be sown in pots filled with the above sort of earth, in the early spring, and plunged in the hot-bed of the stove. When the plants have acquired a few inches growth, they should be removed into single pots with a little earth about their roots, and be replunged in the hot-bed in the stove, being preserved in it, or the warmest part of the green-house, during the winter.

The first three sorts afford an agreeable variety in the borders and clumps, as they continue long in flower. The four following kinds are likewise hardy, and afford variety among other potted plants in the open air during the summer.

The other species are more tender, but produce an agreeable effect among the stove and green-house collections, from the great beauty and continuance of the flowers in many of the sorts.

ERIGERON, a genus comprising plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoidæ*.

The characters are: that the calyx is common oblong, cylindric, imbricate: scales subulate, upright, gradually longer, nearly equal: the corolla compound raved: corollets hermaphrodite, tubular in the disk; females ligulate in the ray; proper of the hermaphrodite funnel-form; border five-cleft: of the female ligulate, linear, subulate, upright, commonly quite entire: the stamina in the hermaphrodites have five filaments, capillary, very short: anthers cylindric, tubular: the pistillum in the hermaphrodites has the germ very small, crowned with a down longer than its corollet: style filiform, length of the down: stigmas two, very slender: there is no pericarpium: calyx converging: the seeds in the hermaphrodites oblong, small: down long, hairy: of the females extremely like the hermaphrodites: the receptacle naked, and flat.

The species mostly cultivated are: 1. *E. viscosum*, Clammy Erigeron; 2. *E. Canadense*, Canadian Erigeron; 3. *E. purpureum*, Purple Erigeron, or Labrador Aster.

Other species may be cultivated for variety.

The first has an upright, stiff stem, near three feet high, striated, hairy, viscid, branched from the very bottom: the leaves thick, rough with hairs, having glands between them exuding a clammy juice, strong smelling, bent down at the base, rounded and stem-clasping: on the branches linear, entire, four inches long and two broad: the peduncles two-leaved, one-flowered; scarcely longer than the leaves: flowers radiate, of a yellow colour; appearing in July, and affording an agreeable smell. It is a native of the South of France, &c.

The second species has an annual root: the stem firm, hairy, sometimes three or four feet high, frequently crooked, much branched towards the top, and even from the middle: the branches gradually shorter, and forming a long cone: the lower leaves oval, tapering to a foot-stalk, with large blunt distant teeth; higher up lanceolate, distinctly serrate, (or entire) slightly hairy on the upper, but more so on the

lower surface, those on the branches and at their base linear-lanceolate, entirely sessile: flowering-heads numerous, on simple or branched slender peduncles. It came originally from North America, flowering in August. It is sometimes called White Golden Rod.

The third has a perennial root: the stem herbaceous, branched, a foot or more in height: the leaves alternate, sharp, either entire, or with a few teeth about the edge: the flowers panicled: leaflets of the calyx lanceolate, sharp, unequal, smooth, slightly keeled; the keel having a few hairs scattered over it: corollets of the ray very numerous, purple; of the disk yellow. It is a native of Hudson's Bay, flowering in July and August.

Culture.—These plants may be increased by sowing the seeds in patches, in the perennial sorts in the autumn, and the annual ones in the spring, in the borders, clumps, or other parts where the plants are to remain. They should afterwards be kept free from weeds, and be properly thinned.

The perennial kind may likewise be increased by off-sets or slips from the roots, which should be planted out in the autumn, where the plants are to continue.

The first kind requires a dry soil and sunny exposure. The perennial sort flowers the second year.

They are plants which afford ornament and variety among others of the flowering kind.

ERINGO. See **ERYNGIUM**.

ERINUS, a genus comprising plants of the herbaceous and shrubby perennial kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a five-leaved perianthium: leaflets lanceolate, upright, nearly equal, permanent: the corolla one-petalled, unequal: tube ovate-cylindric, length of the calyx, bent back: border flat, five-parted: divisions equal, obcordate: the stamina have four filaments, very short, within the tube of the corolla, of which the two opposite ones are a little longer: anthers small: the pistillum is a somewhat ovate germ: style very short: stigma headed: the pericarpium is an ovate capsule, rolled up in the calyx, two-celled, gaping two-ways: the seeds numerous and small.

The species are: 1. *E. Alpinus*, Alpine Erinus; 2. *E. fragrans*, Sweet-smelling Erinus.

Other species may be cultivated for variety.

The first has a perennial root: the root-leaves form a thick tuft close to the ground, are all linear-spatulate, pubescent, with a few serratures at the end on both sides: the leaves on the stem

alternate, of a dark green colour: stems many, very simple, a hand high, round, pubescent, upright; the side-ones barren and decumbent: flowers alternate, of a purple colour, separated by leaves like those on the stem, but smaller, and forming an upright, simple raceme. They appear in May, or earlier. It is a native of Germany.

The second species has a simple stem: leaves alternate, from the axils; spike long with the flowers remote; corollas tomentose on the outside, of a dark colour, fragrant at night. It is a native of the Cape.

Culture.—The first sort may be increased by parting the roots, and planting them where they are to remain in the early autumn. They succeed the most perfectly in situations where the soil is a loamy sand and not enriched by the application of manure, as under other circumstances they are apt to rot, and be destroyed.

The second kind may be increased by planting cuttings of the young shoots early in the spring or summer months, in pots of fresh light earth, plunging them in the hot-bed of the stove. When they are well rooted, they should be removed into separate pots and placed in the green-house, where they must be constantly kept, and have a pretty free admission of air as well as frequent slight waterings.

They are plants that afford variety in the different situations where they grow. The first is a very desirable little plant for the decoration of rock-work, as it grows in close tufts, and produces numerous lively purple flowers during most of the summer season.

ERIOCEPHALUS, a genus containing a plant of the shrubby evergreen kind.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Nucamentaceæ*.

The characters are: that the calyx is common upright: scales ten, ovate, equal, converging, of which the five exterior are keeled, the interior flat: the corolla compound rayed: corollules hermaphrodite twice as many as in the disk: females five in the ray: proper of the hermaphrodite funnel-form; border five-cleft, patulous: of the ray ligulate, obcordate, with three-lobed, equal tips: the stamina in the hermaphrodites consist of five filaments, capillary, very short: anthers cylindric, tubular: the pistillum in the hermaphrodite is a very small germ, naked: style simple; stigma two-cleft, sharp: in the females, germ ovate, naked: style simple, stigma acuminate, inflex: there is no pericarpium: calyx scarce changed: there is no seed to the hermaphrodites: females solitary, obovate, naked: the receptaculum naked, flat; or else a down of

the calyx in a double row is interspersed both between the hermaphrodite and female floscules.

The species are: 1. *E. Africanus*, Cluster-leaved Erioccephalus; 2. *E. racemosus*, Silvery-leaved Erioccephalus.

The first has a shrubby stalk, from four to six feet high, putting out many side-branches the whole length: the leaves are woolly, coming out in clusters, some taper and entire, others divided into three or five parts, which spread open like a hand; they have a strong smell when bruised approaching to that of Lavender Cotton: the flowers are produced in small clusters at the ends of the branches, and stand erect: the female florets composing the ray form a hollow, in the middle of which the hermaphrodite florets forming the disk are situated: the border is white, with a little reddish cast on the inside, and the disk is of a purplish colour. It flowers from January to March.

The second species has the stature and appearance of the first, but all the leaves are undivided: the flowers are on pedicles shorter than the calyx: outer scales of the calyx four, ovate, subtomentose, with a very soft wool from the bosom of them. It flowers in March and the following month.

Culture.—These plants may be raised by layers or cuttings of the young shoots. The former should be laid down in the early autumn or spring, and the latter planted during the summer, in pots filled with light earth, and plunged in a moderate hot-bed, being shaded till they become well rooted, and frequently refreshed by small waterings. When the layers or cuttings have stricken root perfectly, they should be taken off, or removed into separate pots, and placed in an airy situation in the green-house to prevent their being drawn up too much; afterwards they may be set out in the open air in a warm aspect till the approach of autumn, when they must be removed into the green-house again, and placed so as to have much sun and free air when the weather is mild, carefully guarding them against frost and moist air.

They should be very sparingly watered in winter, but when in the open air in summer it will be frequently necessary.

From their retaining their leaves all the year, they have a very ornamental effect in winter.

ERYNGIUM, a genus containing plants of the hardy flowering biennial and perennial kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is a common conic receptacle, chaffs separating the sessile floscules: involucre of the receptacle many-leaved, flat, exceeding the floscules: perianthium proper.

five-leaved, upright, sharp, exceeding the corolla, seated on the germ: the corolla universal, uniform, roundish: floscules all fertile: proper five-petalled: petals oblong, the tips bent inwards to the base, straightened longitudinally by a line: the stamina consist of five capillary filaments, straight, exceeding the floscules: anthers oblong: the pistillum is a hispid inferior germ: styles two, filiform, straight, length of the stamens: stigmas simple: the pericarpium is an ovate fruit, divisible in two directions: the seeds oblong, and columnar.

The species cultivated are: 1. *E. fœtidum*, Stinking Eryngo; 2. *E. planum*, Flat-leaved Eryngo; 3. *E. maritimum*, Sea Eryngo, or Sea-Holly; 4. *E. amethystinum*, Amethystine Eryngo; 5. *E. alpinum*, Alpine Eryngo.

The first has an annual or biennial root. The root-leaves bluish; the serratures terminating in harmless spines. The stem a foot high or more, green, somewhat angular, dichotomous, spreading; with the extreme branches flexuose. The leaves on the branches opposite, stem-clasping, wedge-shaped, subconnate, with the edge toothed and semitrifid; the divisions lanceolate, all the angles terminating in a purplish spine. The peduncle springs from the angles of the stem; it is straight, shorter than the internode, triangular, streaked on the sides. The involucre is composed of six leaflets or thereabouts; are horizontal, and longer than the flower; the leaflets are lanceolate, nerved, and have a spine at the tip and at one or two of the serratures. The common receptacle is cylindric, whence the flower is cylindric. It is of a dull white colour, appearing at the divisions and extremities of the branches. The whole plant has a very penetrating, strong, but not unsavoury smell. It is a native of Virginia, flowering in June and July.

The second species has a perennial root. The stem upright, round, furrowed or streaked, whitish, about a foot and half in height, bluish at top, where it divides into three parts, each of which is terminated by a peduncled axillary flower. Lower leaves cordate ovate, obtuse, on long petioles, with unequal, mucronate notches about the edge; stem-leaves sessile; the uppermost lobed, gashed, smaller serrate, the notches spinulose. The flowers in terminating heads, fenced with a six-leaved involucre, spreading and reflex. It is a native of Austria, &c. flowering in July.

There is a variety with white stalks and flowers.

The third has a creeping root, running deep into the ground. The leaves roundish, stiff, gray, set with sharp spines on the edges. The stems

a foot high, branched, smooth, having at each joint leaves of the same form with the lower ones, but smaller. The flowers come out at the ends of the branches in roundish prickly heads, and are of a whitish blue colour; under each head is a range of narrow, stiff, prickly leaves, spreading like the rays of a star. The flowers appear in July. It is a native of Britain, &c. The young flowering-shoots when eaten as asparagus are very grateful, and of a nourishing quality.

The fourth species has the lower leaves divided like the fingers of a hand, into five or six segments, which are very much cut at their extremities into many parts, and have small spines. The stem is about two feet high, with smaller and more divided leaves. The upper part of the stem, and also the heads of flowers, are of the finest amethystine colour, making a fine appearance. It is a native of Styria, flowering in July.

The fifth species has a perennial root. The leaves are cordate and toothed, the lower on long petioles, the upper stem-clasping. The lower leaves resemble those of *Cacalia*, but are more acute, and the teeth end in a soft spine. Amethystine leaves surround the oblong head of flowers; some of them bristle-form and reflex, others pinnatifid and lanceolate. It is curious, according to Villars, on account of the beauty of the involucre, which are of a vinous azure blue, mixed with green and white. It is a native of Switzerland, &c.

Culture.—Some of these plants may be increased by seed, and the others by planting their creeping roots.

The first, second, fifth, and sixth sorts are raised by sowing the seeds, in the first on a hot-bed or in pots plunged into it, but in the others in the autumn, in the places where the plants are to grow.

When the plants have attained some growth, in the first kind, they should be removed into separate small pots, filled with light, fresh, fine mould, and replunged into the bark hot-bed, being afterwards managed as other exotic plants of the tender kind. The plants usually flower the second year, and then die. In the other species all the culture that is required after the plants appear is that of thinning them properly, keeping them free from weeds, and digging the ground about them in the early spring season.

The third species must be increased by planting portions of the creeping roots of the young plants in a dry gravelly soil in the autumn, as soon as the stems decay. They grow the largest and most fleshy in the root in such situations as are occasionally overflowed by the sea-water.

They afterwards only require the culture of being kept free from weeds.

They are all proper for being introduced in the borders or other parts of pleasure-grounds for variety, except the first, which requires the protection of the stove.

ERYSIMUM, a genus furnishing a plant of the flowery perennial kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate-oblong, parallel-converging, coloured, deciduous: the corolla is four-petalled, cruciform: petals oblong, flat, extremely obtuse at the tip: claws length of the calyx, upright: gland nectariferous double, within the shorter filament: the stamina consist of six filaments, length of the calyx; of these the two opposite shorter: anthers simple: the pistillum is a linear germ, four-cornered, length of the stamens: style very short: stigma headed, permanent, small: the pericarpium is a long silique, linear, strict, exactly four-cornered, two-valved, two-celled: the seeds very many, small, and roundish.

The species principally cultivated is *E. Bartarea*, Winter Hedge Mustard, Cress, or Yellow Rocket.

It has a perennial root. The stem a foot or eighteen inches high, smooth, round, deeply furrowed, much branched. The leaves smooth, dark green, having two or three pairs of roundish lobes, connected to a broad foliaceous rib; the extreme lobe much the largest, and either of an oval or blunt rhomboidal figure, slightly indented on the edges; but varying much in form. The flowers are in racemes or thick spikes at the ends of the stem and branches, of a yellow colour. It is sometimes cultivated for spring salad, under the name of French or American Cress.

It varies with double flowers, which is the Double Yellow Rocket.

Culture.—These plants may be readily increased by sowing the seeds in the autumn or spring in the places where they are to remain, afterwards keeping them properly thinned, and clear from weeds.

The double variety may be propagated by offsets or slips from the roots, planted out in autumn.

This species is sometimes sown as a warm spring salad herb.

The double variety is employed as an ornamental plant in the borders, &c.

ERYTHRINA, a genus comprising plants of the herbaceous and shrubby exotic kind.

It belongs to the class and order *Diadelphina Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, entire, tubular: mouth emarginate above; beneath furnished with a melliferous pore: the corolla papilionaceous, five-petalled: standard lanceolate, with sides bent back, ascending, very long: wings somewhat ovate, scarce longer than the calyx, scarce projecting beyond the tube of the standard, very small: keel straight, length of the wings, two-petalled, emarginate: the stamina consist of ten filaments, conjoined at the lower part, but little bent in, the length of half the standard, unequal: anthers ten, sagittate: the pistillum is a pedicelled germ, subulate, attenuated into a subulate style the length of the stamens: stigma terminal, simple: the pericarpium is an extremely long legume, protuberating at the seeds, terminated by a point, one-celled: the seeds kidney-form.

The species chiefly cultivated are: 1. *E. herbacea*, Herbaceous Coral-Tree; 2. *E. carnea*, Flesh-coloured Coral-Tree; 3. *E. Corallodendron*, Smooth-leaved Coral-Tree; 4. *E. picta*, Prickly-leaved Coral-Tree.

The first has a large woody root, from which fresh shoots come out every spring, growing to the height of about two feet, which seldom throw out branches, and are sometimes perennial. The leaflets are hastate, deep green; the upper part of the stalks terminated by a long bunch or spike of scarlet flowers. The legumes five or six inches long, containing five or six scarlet seeds. It flowers in September, but never produces seeds in this climate. It grows naturally in South Carolina.

In the second species the seeds are not half so large as those of the third, and are of a bright scarlet colour; the leaves are also much smaller, and have long acute points; the branches are very closely armed with crooked greenish spines, as are also the ribs and foot-stalks of the leaves. The flowers grow in very long close spikes, and are of a beautiful scarlet colour. It is a native of La Vera Cruz.

The third has a thick woody stem, which rises about ten or twelve feet high in this climate, but where it is a native to twice that height, sending out many strong irregular branches, which are covered with a brown bark. The leaves are on long foot-stalks; the middle leaflet much larger than the other two; they are all heart-shaped, smooth, and of a deep green colour. The flowers come out at the ends of the branches, in short thick close spikes; are of a deep scarlet colour, and make a fine ap-

pearance; are mostly in beauty in May and June, but not succeeded by pods here: in America they have thick swelling crooked pods, containing large seeds of a reddish purple colour. The leaves fall off in spring, and new ones are put forth in autumn, which continue green all the winter; but the flowers do not appear till the leaves are shed.

The fourth species has shrubby branched stalks, seldom above eight or nine feet high, armed in every part with strong crooked black spines. The leaves are smaller than those of the preceding, and have a nearer resemblance to the first; the foot-stalks are armed with the same sort of spines, and the midrib has also some which are smaller, and not so black: the flowers are of a paler scarlet, and grow in looser spikes. The seeds are as large as those of the third sort, but of a dark purple colour. It is usually planted in the East Indies as a support to Pepper plants.

Culture.—These plants may all be raised by sowing the seeds, obtained from their native situations, in pots filled with light good mould, in the early spring, plunging them in a moderate hot-bed. When the plants have attained an inch or two in growth they may be shaken out of these pots, and planted in separate small pots of the same sort of earth, re-plunging them in a mild bark hot-bed, giving them proper shade, air, and water during the summer; but keeping them in autumn in the stove. As the plants advance in growth they must be removed into larger pots.

They are likewise capable of being increased by planting cuttings of the young shoots in pots of light earth during the summer season, plunging them in the hot-bed. The seedling plants are however the strongest.

They afford ornament and variety among collections of other stove plants.

ERYTHRONIUM, a genus consisting of a plant of the low flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx: the corolla has six petals, oblong-lanceolate, acuminate, alternately incumbent towards the base, gradually more spreading, from the middle bent backwards: nectaries two: tubercles obtuse, callous, growing to each alternate and interior petal near the base: the stamens consist of six subulate filaments, very short: anthers oblong: the pistillum is a turbinate germ: style simple, shorter than the corolla, straight: stigma triple, spreading, obtuse: the pericarpium is a somewhat globose capsule, narrower at the

base, three-celled, three-valved: the seeds are very many, ovate, acuminate.

The species is *E. Denis canis*, Dog-tooth Violet.

It has two ovate leaves joined at their base, three inches long, and one inch and a half broad in the middle, gradually lessening towards the ends; these at first embrace each other, inclosing the flower, but afterwards spread flat upon the ground; are spotted with purple and white all over their surface. Between them rises a single, smooth, purple, naked stalk, about four inches high, sustaining one flower of a purple colour, which hangs down. The roots are white, oblong, and fleshy, shaped like a tooth. It grows naturally in the south of France.

There are varieties with longer and narrower leaves, and the flowers a little larger, but not so well coloured; with darker green leaves, and pale yellow flowers; and with white flowers.

Culture.—The plant may be increased by planting off-sets from the roots, in shady situations, where the soil is of a loamy quality, in the latter end of the summer, after the stems are decayed, in patches of several together. They should not be too often removed, or kept long out of the ground.

They have a good effect in the fronts of borders, &c. as early flowering plants.

ESCULENT PLANTS, all such as are eatable, and cultivated in the kitchen-garden for the purpose of food, whether of the root, bulb, or herb kinds.

ESPALIER TREES, such fruit-trees of low growth as are trained to treillages or framed wood-works for the purpose, in ranges, so as to constitute a sort of hedge. They are usually planted in single rows along the borders, on the sides of the principal walks, in the main divisions of the garden, affording shelter to other plants as well as ornament.

The sorts of fruit-trees mostly employed in this way are those of the apple, pear, and plum kinds; but many others may be managed in this method, where variety is wanted; as the quince, cherry, almond, apricot, mulberry, and filbert. And it is necessary, with a view to beauty and uniformity, to manage them in such a manner as to have those that are nearly of the same growth in the same range or line.

The sorts of apple most adapted to this use are those of the golden and other pippin kinds, the nonpareil, rennet, and russet.

In the pear kind, the jargonelle, blanquette, bergamot, burrè du Roy, &c. the *melting* pears being always better in this way than those of the *breaking* kind. On strong moist soils those grafted on quince stocks are the best, but on dry ones those on free stocks.

Trees intended for this use should be grafted or budded within a few inches of the surface of the ground, that branches may be thrown out regularly from the bottom upwards, to furnish and fill the treillage; and the more effectually to accomplish the purpose, the first shoots from the grafts, &c. should be cut off, or headed down, within a few inches of the grafts, in the spring season, when they have had one year's growth. The branches or shoots thus produced, whether the trees are in the nursery, or planted out as espaliers, should in the latter part of the summer, or beginning of autumn, be trained both ways laterally in their advancing growth, to stakes put down for the purpose, or the espalier frames. In this way the trees acquire a proper form, those in the nursery being thus trained and kept for sale. A second heading down in the upper branches may likewise be practised when necessary, in order to fill up the middle, and completely cover the frames.

When these trees have been thus trained for three or four years in the nursery-ground, they are generally in a proper situation for being planted out as espaliers in the borders or other parts along the sides of the walks in the garden or pleasure-grounds, a sufficient breadth being allowed for the borders, according to the size or extent of such grounds, as six, eight, ten, or more feet.

Besides this, there is another method sometimes practised in forming espalier trees, which is that of, after heading the first shoots down as above, training the side-shoots horizontally in the direction of the frames, and the middle one upright, forming the lateral shoots, which it throws out horizontally on each side; and, if they are not thrown off sufficiently low, heading the upright one down, by which lateral branches will be sent off, so as to range with regularity at the distance of six or seven inches, one above another, on each side, from the bottom to the top. In this way the trees have a very neat appearance.

In planting the trees out, when they are of the apple or pear kind, on dwarf stocks, the distance in the rows should be fifteen, eighteen, or twenty feet; and when on free stocks, not less than twenty or thirty, and for free growing trees considerably more. For plums, the distance should be eighteen feet or more; and for cherries, apricots, almonds, and mulberries, it should never be less than fifteen. Considerably less distance will however be sufficient for silberts, especially in the poorer sorts of soil.

When these trees have been planted, it is the usual practice to put stakes down in a line to train them to for the two or three first years;

but it has a much neater appearance to have the treillage fixed down to train them to at once.

Frames for this use are made in different ways, according to the taste of the person who has them; but the most usual sort are those constructed of three or four inches square pieces of oak timber for the posts, with rails of deal carried from post to post, at the distance of every ten or twelve inches from the bottom to the top. Between these rails thin upright pieces are again sometimes fixed at the same distances, for particular purposes. The whole should be well painted over in oil some time before the trees are to be trained to it. This last is performed either by tying the branches to the trellis by osier twigs, woollen-yarn, or other similar substance, or by nailing them in the manner of wall-trees. In whichever way it is done, the greatest exactness and regularity should be observed in laying in and directing the shoots.

The manner of performing the future pruning and managing of these trees will be explained when we come to speak of the nature of pruning in general. See PRUNING OF FRUIT-TREES.

These sorts of trees are chiefly advantageous in admitting the branches to produce fruit spurs on both sides, which is not the case with wall-trees; in taking up but little room in the garden; in not being so injurious to the crops that are near them; in affording fruit of a finer flavour, from the more free admission of air and sun, and in the fruit not being so liable to be blown down and injured.

ETIOLATION OF PLANTS, the rendering them white, crisp, and tender, by excluding the action of light from them. See BLANCHING.

EVERGREEN TREES, such trees, whether of tall or shrubby growth, as constantly retain their leaves during the whole year. There are a great number of this sort of plants, which will be particularly described under their proper genera.

These kinds of trees, shrubs, &c. are increased in different modes, according to their particular nature, as by seeds, layers, cuttings, suckers, &c. which is fully shown under the culture of the different sorts, but principally in the spring season, though occasionally in the summer, and frequently in the early autumn.

The proper seasons for planting them out are the early autumn or later spring months, according to the nature of the soil. Where the soils are of the more stiff, retentive, moist kind, the more advanced spring months are the best; but where they are of the light dry loose description, the beginning of the autumn is the

most proper period; as in the former case the plants will be in no danger of being injured by stagnant moisture in the winter, and in the latter there will be no risque of their being destroyed by the heat and dryness of the summer, before they become perfectly established.

In the planting of Evergreens it is seldom necessary to put them in to any great depth, as they are very liable to be destroyed by deep planting. There is likewise another circumstance that ought to be regarded, which is that of having the mould in which they are to be set sufficiently fine, and the roots well bedded in it, without being much cut in or retrenched. In all cases the loose mould should be well trodden in about them; and the more tall growing kinds well supported with strong stakes, so as to keep them perfectly steady in their situations. Numbers of trees of this as well as other sorts are destroyed for want of attention in this respect.

The pruning or cutting in of this sort of trees, where it is necessary, should be performed either in the more advanced spring season, or the latter part of the summer, but never in the winter season, as they are liable to much injury from cold. This is equally necessary to be regarded in the clipping of hedges constituted of plants of this sort.

Many of these sorts of trees and shrubs are sufficiently hardy to admit of being planted in most sorts of soils and situations. The tall-growing kinds are well adapted for affording ornament and variety in mixture with those of the deciduous class in extensive plantations, and such as are of a shrubby growth in the borders, clumps, and other parts of ornamented grounds. In these situations they should be suffered as much as possible to take their natural growth, especially the fir kinds, and in the others only very little cut in, and the dead wood removed.

In the forming of hedges various plants of this sort are employed; but the best are those of the holly, yew, evergreen privet, and box kind; though the common laurel and laurustinus may be the most advisable where they are required to be lofty. These are likewise capable of being trained so as to cover naked walls, palings, or other unpleasant objects. Hedges formed of these plants should be clipped in once or twice during the summer season, so as to keep them in perfect neat order.

Various ornamental devices were formerly made with these and other sorts of evergreens in gardens; but these are at present little in use, as a better and less troublesome taste prevails.

It has been remarked by the author of "The Philosophy of Gardening," that in these sorts of

trees and shrubs, the buds rise in the bosoms of the leaves, which, as they are not shed in the autumn, they continue to oxygenate the juice of the plants, and supply nutriment to the buds during the fine days in the winter and spring seasons, surviving till nearly the middle of summer, when the new buds have expanded leaves of their own. It is hence conjectured that evergreens provide no store of nourishment in their roots or alburnum in the summer for the support of their ensuing vernal buds, and of course have probably no bleeding season, as is the case with those of the deciduous kind.

There is another circumstance which has been stated by Dr. Milne, in his Botanical Dictionary, to take place in respect to evergreens, which is, that when they are engrafted on those of the deciduous sort, it determines the latter to retain their leaves. This is asserted to be confirmed by repeated experience, in grafting the laurel, *lauro-cerasus*, an evergreen, on the common cherry, *cerasus*, and the *ilex*, an evergreen oak, on the common oak.

EVERGREEN THORN. See *MESPILUS PYRACANTHA*.

EVERLASTING. See *GNAPHALIUM*.

EVERLASTING PEA. See *LATHYRUS*.

EUGENIA, a genus containing plants of the exotic shrub or tree kind.

It belongs to the class and order *Isosandria Monogynia*, and ranks in the natural order of *Hesperideae*.

The characters are: that the calyx is a one-leafed superior perianth, elevated in the middle into a subvillose little ball, four-parted; divisions oblong, obtuse, concave, permanent: the corolla has four petals, twice as large as the calyx, oblong, obtuse, concave: the stamina have very many filaments, inserted into the ball of the calyx, length of the corolla: anthers small: the pistillum is a turbinate, inferior germ: style simple, length of the stamens: stigma simple: the pericarpium is a four-cornered drupe, crowned, one-celled: the seed a roundish, smooth nut.

The species cultivated are: 1. *E. malaccensis*, Broad-leaved Eugenia; 2. *E. jambos*, Narrow-leaved Eugenia; 3. *E. uniflora*, One-flowered Eugenia.

The first, in its native situation, rises with a tree-like stem, from twenty to thirty feet high, covered with a brown bark, and sending out many branches. The leaves are oblong, ending in acute points, opposite; when young of a bright purple colour, but as they grow older becoming of a light green. The flowers are produced on the sides of the branches; every peduncle branching into three or four others,

each of which supports one flower: the fruit succulent, irregularly shaped, and inclosing a single nut of a roundish form, commonly obtusely quadrangular; but sometimes ovate, an inch and half in diameter, fleshy, very sweet, smelling like the rose, covered with a thin shining yellowish skin; and commonly containing one large seed, roundish, and softish, but not bony: the fruit is very agreeable to the taste, smell and sight, and esteemed wholesome. Forster describes it as whitish, tinged with rose-colour, pear-shaped, and sometimes as big as the fist, but usually much smaller. It is common in the islands in the South Sea.

The second species rises to the same height, but the leaves are longer and narrower: the flowers terminating, but some come out from the sides, greenish yellow: the fruit smaller, rounder, pear-shaped, white and red, and not so much esteemed. It is a native of the East Indies, &c. flowering from May to July.

The third species has solitary peduncles: the flowers are white: fruit bright red, soft, slightly grooved, and having a sweet smell. First brought from Goa.

Culture.—These plants may be propagated by setting the stones of the fruit as soon as procured from the places where they grow naturally, in pots filled with light mold, plunging them in the hot-bed, and keeping the earth about them constantly moist, but not too wet.

When the plants have attained five or six inches growth, they should be carefully removed and placed in separate pots of a small size, replanting them in the hot-bed, due shade being given till they are well rooted again. They afterwards require to be managed as other tender plants of the same nature, to be retained constantly in the stove, and to have but little water in the winter season.

They may likewise be sometimes raised by laying down the young shoots under the same circumstances.

They afford variety in stove collections among other curious exotic plants.

EUONYMUS, a genus comprising plants of the hardy flowering shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosa*.

The characters are: that the calyx is a one-leaved, five-parted, flat perianthium: divisions roundish, concave: the corolla has five petals, ovate, flat, spreading, longer than the calyx: the stamina consist of five subulate filaments, upright, shorter than the corolla, placed on the germ as it were on a receptacle: anthers twin: the pistillum is an acuminate germ: style short, simple: stigma acute: the pericarpium is a

succulent capsule, coloured, five-sided, five-cornered, five-celled, five-valved: the seeds solitary, ovate, involved in a berried aril.

The species cultivated are: 1. *E. Europæus*, Common Spindle-Tree; 2. *E. latifolius*, Broad-leaved Spindle-Tree; 3. *E. verrucosus*, Warted Spindle-Tree; 4. *E. atro-purpureus*, Purple-flowered Spindle-Tree; 5. *E. americanus*, Ever-green Spindle-Tree.

The first is a shrub; but if planted singly, and properly trained, it will rise more than twenty feet high, with a strong woody stem dividing into many branches: the leaves are lanceolate, about three inches long, and an inch and quarter broad in the middle, opposite, entire, of a deep green colour: the flowers come out at the end of May or the beginning of June, in small bunches from the side of the stalks on slender peduncles: the petals are whitish, and spread in form of a cross: the fruit ripens in October, when the seed-vessels spread open and expose the seeds, which being of a beautiful red colour render the appearance of these shrubs very fine.

The second species rises with a stronger stem than the first, and grows to a larger size: the leaves are ovate-lanceolate, about four inches long, and two broad in the middle, opposite, entire, light green, on short foot-stalks: the flowers come out from the side of the branches, upon very slender peduncles, two inches and a half long, branching out into a loose bunch, and the flowers on separate pedicles, of a purplish colour: the fruit is much larger than in the common sort, and always hangs down. It is a native of Austria, &c.

The third differs from the two former in having the stem and branches warted, the upper surface of the petals covered with a pile consisting of very small teats: the anthers rounded, and placed upon their pyramidal filaments like the cap of a mushroom; a raised tubercle supporting each filament: the receptacle variegated, with red dots: it has no style, but instead of it a stigma like a bladder: the capsule is more flattened at top, the surface a little wrinkled, and as broad as long: the seeds half black. It is a native of Austria, &c., flowering in May and June.

The fourth species is a shrub about six feet high, with an ash-coloured bark, smooth, and free from tubercles: the branches are round, and a little compressed at their extremities: the leaves oblong-lanceolate, smooth on both sides, veiny on the back, and stand opposite; are very finely serrated on the edges, where they are of a purple tinge, as are also the foot-stalks: all the flowers (which are dark purple) are constantly tetrandrous. It is a native of the northern parts of Asia.

The fifth rises with a shrubby stalk to the height of eight or ten feet, dividing into many branches, which come out opposite from the joints of the stem: the leaves are lanceolate, two inches long, and about three quarters of an inch broad in the middle, ending in acute points; are opposite, and continue green all the year: the flowers are produced at the ends of the branches, and also from the sides, in small clusters; and are succeeded by round capsules, which are closely armed with rough protuberances. It flowers in July, but seldom produces ripe fruit in this climate.

There is a variety with variegated leaves.

Culture.—The four first sorts may be propagated either by seeds, layers, or cuttings of the young shoots.

In the first mode, the seeds should be sown in the clumps or borders in the early autumn, covering them well in. In the following autumn the plants should be removed and set out in nursery rows, being kept well cleared from weeds during the summer. After two or three years growth in this situation, they will be fit to plant out for good.

The young shoots may be laid down in the autumn, a slit being made at a joint placed the deepest in the ground. In the following autumn they will be well rooted, and may be taken off and planted out in the manner of the seedlings.

The cuttings should be made eight or ten inches in length, and planted in a shady border in the autumn. When they have struck full root, they should be carefully removed, and managed as those raised from seed.

The two last methods, and those of budding and grafting are the only ones by which the varieties can be continued with certainty.

The last species is best increased by laying down the young branches after being tongued in the autumn, managing them afterwards in the same manner as the others.

These plants are sufficiently hardy to bear the open air when planted in warm sheltered situations.

They are all very ornamental; the former sorts producing a fine effect by their berry-like seeds, and the last by its evergreen leaves.

EUPATORIUM, a genus comprising plants of the herbaceous flowery kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common oblong, imbricate: scales linear-lanceolate, upright, unequal: the corolla compound uniform, tubular: corollets hermaphrodite, equal; proper funnel-form: border five-cleft, spreading: the stamina consist of five capillary filaments, very short; anthers cylindric, tubular: the pistillum

is a very small germ: style filiform, very long, two-cleft almost to the germs, straight: stigmas slender: there is no pericarpium: calyx unchanged: the seeds oblong: down plumose, long; (pilose, only toothletted or ciliate:) the receptacle naked.

The species cultivated are: 1. *E. altissimum*; Tall Hemp Agrimony; 2. *E. purpureum*, Purple Hemp Agrimony; 3. *E. maculatum*, Spotted Hemp Agrimony; 4. *E. perfoliatum*, Perfoliate Hemp Agrimony; 5. *E. aromaticum*, Aromatic Hemp Agrimony.

There are other species that maybe cultivated.

The first rises with a single upright green stalk, about four feet high. At each joint are four leaves in whorls; they are six inches long, and two inches broad in the middle, lessening to both ends, terminating in acute points, rough, serrate, and on short foot-stalks: the stem terminated by a close corymb of purple flowers; appearing in July, and continuing till September. It is native of North America.

The second species grows to the height of three feet or more, with a suffruticose, upright, striated stem, but little branched: the leaves are subsessile, and of a dark green: the corymb of flowers is fastigate. Native of North America.

The third has an annual stem, about two feet and a half high, purple, with many dark spots upon it: the leaves rough, placed by threes towards the bottom of the stalk, but near the top by pairs at each joint: the flowers are purple, terminating in a sort of corymb, appearing in July and August. It is a native of North America.

The fourth species rises with annual stems, from two to three feet high, and hairy: the leaves at each joint rough, from three to four inches long, and about an inch broad at their base, gradually lessening to a very acute point, dark green, and covered with short hairs: the upper part of the stalk divides into many slender peduncles, each sustaining a close cluster of white flowers, coming out in July. It is a native of North America.

The fifth has a round stem, four feet high, strict, brachiate: the leaves are somewhat wrinkled: racemes terminating: the flowers twice the length of the calyx, snow-white, containing from eighteen to twenty-eight florets; the styles scarcely longer than the floret. In this circumstance it differs from the other species, as well as in having the calyx not imbricate. It is a native of Virginia.

Culture.—These plants may be increased by seeds in many of the sorts which produce them in this climate, and in the others by parting the roots and planting them out.

In the first mode, the seeds should be sown in

the spring or autumn, in the places where they are to remain, a moist situation being chosen for the purpose. Some prefer sowing them in beds, and afterwards transplanting them, but the former is probably the better practice.

In the latter method, the off-sets or heads should be carefully taken off and planted out early in the autumn. The last sort, being the most tender, should be covered with tan in the winter, and the same practice is useful in many of the others, especially the young seedling plants.

The plants should afterwards be kept clean, and have the stalks removed, and the earth carefully dug about them in the spring.

These plants are very ornamental in the large clumps and borders of pleasure grounds, among other flowering kinds.

EUPHORBIA, a genus containing plants of the herbaceous and shrubby succulent kind.

It belongs to the class and order *Dodecandria Trigynia*, and ranks in the natural order of *Tricoccæ*.

The characters are: that the calyx is a one-leaved perianthium, inflated, somewhat coloured, four-toothed at the mouth, (in some few five-toothed,) permanent: the corolla has four petals, (in some few five,) turbinate, gibbous, thick, truncate, unequal in situation, alternate with the teeth of the calyx, with their claws placed on the margin of the calyx, permanent: the stamina consist of several filaments, (twelve or more) filiform, jointed, inserted into the receptacle, longer than the corolla, breaking forth at different times: anthers twin, roundish: the pistillum is a roundish germ, three-sided, pedicelled: styles three, two-cleft: stigmas obtuse: the pericarpium is a roundish capsule, tricoccous, three-celled, starting open elastically: the seeds solitary, and roundish.

The species chiefly cultivated are: 1. *E. anti-quorum*, Triangular Spurge; 2. *E. Canariensis*, Canary Spurge; 3. *E. officinarum*, Official Spurge; 4. *E. caput-Medusæ*, Medusa's-head Spurge; 5. *E. tithymaloides*, Myrtle-leaved Spurge; 6. *E. heptagona*, Seven-angled Spurge; 7. *E. mammellaris*, Warty-angled Spurge; 8. *E. lathyris*, Caper Spurge.

Other species may be cultivated.

The first has a triangular, compressed, succulent stem, rising to the height of eight or ten feet, and sending out many irregular spreading twisting branches, for the most part three-cornered, but having some two, and others four angles; at their extremities are a few short roundish leaves, which soon fall off; and near these come out occasionally a few flowers, which have five thick whitish petals, with a large three-

cornered germ in the centre; the flowers soon dropping off without producing seeds. It grows naturally in the East Indies.

It has generally been taken for the true *Euphorbium*; but Martyn observes, that it is from the second sort that the drug now imported under that name is taken.

There is a variety with a naked three-cornered compressed stalk, sending out a great number of erect branches, which are also generally three-cornered, but sometimes four-cornered; armed with short crooked spines, having no leaves. The plants have not produced flowers here. It is also a native of India.

The second species, in its native country, grows to the height of twenty feet or more, but in this climate it is rarely seen more than six or seven: the stem is very thick, green and succulent, having four or five large angles, closely armed with black crooked spines, which come out by pairs at every indenture: it sends out from every side large succulent branches of the same form, which extend to the distance of two or three feet, then turning their ends upwards, so that the plants when well grown have some resemblance to a chandelier; they have no leaves, but are closely armed with black spines like the stem: at the ends of the branches come out the flowers, which are shaped like those of the first species. It is a native of the Canary Islands, flowering in March and the following month.

The third puts out many stalks just above the surface, which are thick, succulent and roundish, having eight or ten angles whilst they are young, but as they grow old they lose their angles and become round; the branches grow distorted and irregular, first horizontal, but afterwards turning upwards; the angles are armed with small crooked spines; and on the upper part of the branches, in June and July, come out the flowers; they are small, and of a greenish white colour. It is a native of Africa.

The fourth species has thick, roundish, succulent stalks, which are scaly; they send out many branches from their sides of the same form, which are twisted, and run one over another, so as to appear like a parcel of serpents, whence it has the appellation of *Medusa's head*: at the end of these are narrow, thick, succulent leaves, which drop off; and round the upper part of them the flowers come out; these are white, and of the same form with those of the other sorts, but larger; and frequently succeeded by fruit.

There is a variety termed *Little Medusa's Head*, which has a thick short stalk, seldom more than eight or ten inches high, from which come out a great number of slender trailing branches, about a foot in length, intermixing and having

the same appearance with the other, but smaller and much shorter; the ends beset with narrow leaves, between which the white flowers come out and appear. It is a native of Africa.

Some also have a dwarf-trailing and double-branched as well as other varieties.

The fifth species is a wandlike suberect plant, six feet high, the whole of it abounding in a white bitterish milky juice; the stems numerous, round, smooth, weak, very pliant, branched, the thickness of a finger or the thumb, the older ones ash-coloured, the younger green: the leaves some obtuse, others acute, coriaceous, quite entire, petioled, deep green, two or three inches long, deciduous except on the branches, the middle dorsal nerve and the petiole augmented by a longitudinal lamella more or less waved and conspicuous, at first frequently tomentose on both sides, but with the upper surface very even, and the edges extremely waved; afterwards both sides always become flat and smooth: the peduncles one-flowered, short, aggregate about the extremities of the branchlets, coming out principally when the plant is without leaves: the flowers are void of scent, of a beautiful scarlet colour. It is a native of the Caribbee Islands.

There are varieties with laurel leaves and variegated leaves.

The sixth has a roundish, upright, succulent stem, about three feet high, putting out several branches on the side, of the same form; the angles are armed with long, single, black spines: at the ends of the branches come out small flowers, which are sometimes succeeded by small fruit. It is a native of the Cape.

The seventh has also roundish stems, swelling out in the middle, and having knobbed angles, between which come out long straight spines; these stems are two feet high, and put a few branches from their side of the same form, at the ends of which flowers are produced, sitting close upon the angles, they are small and of a yellowish green colour. It differs from the preceding in having the angles doubled and swelling a little; and the spines single between the tubercles, which are placed longitudinally. It is a native of the Cape, flowering in July and August.

The eighth species has an upright, succulent stem, from three to four feet high, with oblong

smooth sessile leaves; the upper part dichotomous, and an umbel comes out from each division; that in the first being the largest, and those in the upper the smallest. The flowers are of a greenish yellow colour, appearing in June and July, and are soon after succeeded by fruit. It is a native of France, &c.

Culture.—All these plants may be raised by setting cuttings made at a joint five or six inches long, after being rubbed in sand, and laid on a shelf a few days to have the wounds healed over, in the summer, about June, in small pots filled with light, dry, sandy mould, with some rubbish at the bottoms, such as that constituted of a fourth part of screened lime rubbish, the same proportion of sea-sand, and one half of light fresh vegetable earth, well mixed and blended together by frequent turning over, plunging them in the bark hot-bed, giving due shade in hot sunny weather, and a little water once or twice a week, as there may be occasion. When the plants have stricken root they should have air admitted pretty freely in that situation, or be removed into the stove to be hardened before winter.

They must afterwards be allowed larger pots once a year as they advance in growth, and be frequently refreshed with water in the summer season, but only very sparingly in the winter.

Most of these sorts are capable of being kept on the shelves of hot-houses, and some of them, as the fifth, sixth, and seventh, in a dry airy green-house, or glass-case, during the winter season, care being taken to guard them against the frost, and in the summer they may be set out in the open air.

The fourth species stands in need of support to prevent the weight of the branches forcing it upon the pots; and by such management they will rise four or five feet in height, producing numerous side-branches.

The eighth sort requires little or no care when once introduced, except keeping the young plants clean, as it will be continued by its scattering the seeds.

The whole of these sorts, except the last, afford variety in hot- and green-house collections, and that in the borders of the pleasure-ground.

FAGARA, a genus containing plants of the exotic kind for the stove.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Dumosae*.

The characters are: that the calyx is a four-cleft perianthium, very small: leaflets concave, permanent: the corolla has four oblongish petals, concave, spreading: the stamina consist of four filaments (three to eight), longer than the corolla: anthers ovate: the pistillum is an ovate germ: style filiform, length of the corolla: stigma two-lobed, obtusish (four-cleft): the pericarpium is a globular capsule, one-celled (or two-celled), two-valved: the seed single, round, and bright.

The species are: 1. *F. Pterota*, Lentiscus-leaved Fagara, or Bastard Ironwood; 2. *F. Tragodis*, Prickly-leaved Fagara.

The first is a shrub with wrinkled branches, which, according to Browne, rises by a branched and somewhat prickly stalk frequently to the height of eight or ten feet; the wood very hard: the leaves alternate, pinnate, with three pairs of leaflets; and the common petiole margined and jointed. The leaflets obovate, quite entire, emarginate, smooth. The spikes axillary, sessile, in pairs. The flower small and white. It is a native of Jamaica.

The second species is a shrub, branching, almost erect, five feet in height. The prickles in pairs, subulate, recurved, strong, subaxillary, brown, shining; there is one similar, but smaller, on the back of each joint of the leaves; these are alternate, sessile, pinnate jointed: leaflets oblong, attenuated at the base, obtuse quite entire, shining, sessile: joints usually six, in every respect similar to the leaflets. The flowers are small, axillary, and aggregate. It is a native of St. Domingo, flowering in February.

Culture.—These plants may be increased by sowing the seeds in pots in the early spring, and plunging them in the bark-bed of the stove. When the plants have attained some growth they should be removed into other pots, and be replaced in the hot-bed.

They may likewise be raised by planting cuttings of the young shoots in pots, and plunging them in the bark-bed in the stove, due shade and water being given till they have stricken root. They should afterwards be removed into separate pots, and be replaced in the stove hot-bed.

These are tender plants, requiring the constant protection of the stove, where they afford variety.

FAGUS, a genus containing plants of the tree kind.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceae*.

The characters are: that the male flowers are fixed to a common amentaceous receptacle: the calyx is a one-leafed perianthium, bell shaped, five-cleft (four-, five-, or six-cleft,) (subsexfid): there is no corolla: the stamina consist of many filaments, the length of the calyx, setaceous: anthers oblong: the female flowers in a bud of the same plant: the calyx is a one-leafed, four-toothed, erect, acute perianthium: there is no corolla: the pistillum is a covered germ with the calyx: styles three, subulate (one-trifid): stigmas simple, reflex: the pericarpium is a capsule (which was the calyx) roundish, very large, covered with soft spines, one-celled, two- to four-valved: the seeds are nuts, one or two, ovate, three-cornered, three-valved, acuminate.

The species cultivated are: 1. *F. sylvatica*, The Common Beech-tree; 2. *F. castanea*, Common Chesnut-tree; 3. *F. pumila*, Dwarf Chesnut-tree, or Chinqua-pine.

The first grows to a very large size, lofty and spreading; the trunk straight, and covered with a whitish bark. The leaves are smooth and glossy, waved on the edges rather than serrate, or slightly sinuate-toothed, three inches and more in length, and two or upwards in breadth: the petioles reddish, slightly grooved above, four or five lines in length, pubescent, as is also the midrib of the leaf. The stipules reddish-brown, shining, lanceolate, conspicuous. It retains the old leaves through the winter. The male catkins come out in bunches from the ends of the small branches; are roundish, obtuse, half an inch long, and almost as broad; on peduncles from half an inch to fourteen lines in length, pendulous, round, and pubescent. The female aments come out from the same place, a little above the others; are erect, and on round; whitish, villose peduncles: the common involucre has two flowers, is four-cleft, and covered with soft spines. The fruit is composed of two nuts joined at the base, covered with an almost globular four-valved involucre, with soft spines on the outside, but within very smooth and silky: the nuts, when ripe, are one-celled

and triangular, containing one or two angular seeds. It is a native of the greater part of Europe, &c.

Martyn remarks that some suppose there are two species of this tree, the *Mountain Beech* and the *Wild Beech*; "the first of which has a whiter wood than the second; but that this difference arises only from the soil."

In the nurseries there are two varieties, one with yellow, and the other with white-striped leaves. And in Germany there is another variety with dark red leaves, which is called the *Purple Beech*. In woods there is likewise a sort with a rougher bark, which is termed *Hay Beech* by woodmen.

The second species grows to a very great size, and spreads its branches finely on every side where it has room; but, planted closely, shoots up straight to a great height. The leaves are large, of a lucid green colour, ending in a long very taper point, and the serratures terminate in a kind of tender prickle; the leaves are about four or five inches long, and two wide, somewhat wrinkled, having several transverse veins, prominent on the under surface, and proceeding from a strong midrib. The aments or catkins of the male flowers are pendulous at the ends of the branches, very long, and resemble those of the walnut. They have a strong spermatic smell; the flowers are collected in remote little balls, and are sessile. The proportion of male flowers to the females is prodigious. The stamens are about nine in number (five to eighteen). In the female flowers the number of styles varies from four to seven, but six is the most common. The calyx becomes an echinate capsule of four valves, of a silky smoothness on the inside, containing two nuts, sometimes three, or only one. It is naturalized to most parts of Europe.

There is a variety cultivated with gold-striped leaves.

The third seldom grows above twelve or fourteen feet high, but produces great plenty of nuts, which are, for the most part, single in each capsule. It is very hardy, and will resist the severest of our winters in the open ground, but is very apt to decay in summer, especially in a dry soil. And, though it delights in moisture, yet, if the wet continues long upon the ground in winter, it frequently destroys it. It is very common in the woods of America.

Culture.—These trees may be increased without much difficulty.

Culture in the Beech kind.—These are raised by sowing the well-ripened seed or mast, on beds of fine mould prepared for the purpose, either in the early autumn or spring season, in slight drills or broadcast, covering them well in

by raking. When the plants come up they should be kept perfectly clear from weeds, and after two years growth be planted out in nursery rows, two feet or two feet and a half apart, and from a foot to eighteen or twenty inches distant in the rows; in which situation they should be kept properly cleared from weeds, and have the intervals of the ground well dug over annually, in the autumn or very early spring. Some advise cutting the roots under with a sharp spade at the depth of four or five inches once or twice while in the seed-bed. When they have attained the growth of four or five feet in height, they are proper for being planted out in plantations, shrubberies, and other places, where they are to grow for ornament or timber. The varieties with striped leaves are to be continued by budding or grafting on common beech stocks, taking care not to plant them where the soil is of the rich kind.

Culture in the Chesnut kind.—These trees may be increased by sowing or planting the nuts, which have been well ripened here, or such as have been brought from abroad, without being dried in kilns, in the early spring, on beds of fresh earth in drills two or three inches deep, and about a foot asunder, placing them three or four inches distant, and covering them well in. When the plants appear, they should be kept clear from weeds, and, after they have had two years growth in these beds, they should be removed into nursery rows in the beginning of autumn, being planted two feet and an half from row to row, and from one to two feet distant in the rows, great care being taken not to injure their roots in taking them up, unless they happen to have tap roots, which must be cut off.

After they have remained in this nursery four or five years, and been kept perfectly free from weeds, by hoeing or slightly digging over the intervals between the rows, they will be in a proper state for being finally planted out as ornamental fruit- or forest-trees. When they are intended to be planted for the fruit, they should be more frequently transplanted before they are finally set where they are to grow; but they are not of much importance in this view, as the fruit does not always ripen well in this climate.

The varieties with variegated or blotched leaves must be continued by budding or inarching them on stocks of the common kind.

The third sort may be raised in the same manner from nuts brought in from America, and have the same method of culture afterwards.

The first sort is frequently made use of as timber-trees and in forming hedges, and the

others as ornamental trees in lawns, clumps, borders, and other parts of pleasure-grounds, where they have a fine effect. They succeed on almost any soil, but the best on those of the loamy kind.

FAIR-MAIDS-OF-KENT. See *RANUNCULUS*.

FAN PALM. See *CHAMÆROPS*.

FEATHER PRINCE'S. See *AMARANTHUS*.

FEATHERED COLUMBINE. See *THALICTRUM*.

FENNEL. See *ANETHUM*.

FENNEL FLOWER. See *NIGELLA*.

FENNEL GIANT. See *FERULA*.

FERRARIA, a genus containing a plant of the herbaceous flowery green-house kind.

It belongs to the class and order *Gynandria Trigynia*, and ranks in the natural order of *Ensatae*.

The characters are: that the calyx has two spathes, alternate, keeled, involute; each one-flowered: the corolla has six petals, oblong, acuminate, revolute, curled, and fringed; alternately smaller: the stamina consist of three filaments, sitting on the style: anthers roundish, twin, rough-hairy: the pistillum is an inferior germ, roundish, three-cornered, obtuse: style simple, erect: stigmas three, bifid, cowl-ed, fringed and curled: the pericarpium is an oblong capsule, three-cornered, thicker at top, three-celled, three-valved: the seeds numerous and roundish.

The species cultivated is *F. undulata*, Cape Ferraria.

It has a tuberose, roundish, compressed root, in shape like that of the Indian corn-flag, but larger; in the centre of the upper side it has a hollow like a navel, whence comes out the stalk; the outer skin is of a light brown colour, the inside white. It lies inactive every other year, and sometimes will remain two years without putting out either leaves or fibres. The stem is a foot and half high, taper, and about the thickness of a man's little finger. It has lanceolate leaves the whole length, placed alternately, and embracing: the lower leaves are from four to five inches long, and an inch and half broad towards their base, ending in obtuse points; a little keel-shaped, and of a light-green colour. The flowers are axillary, solitary, from the upper part of the stem, wrapped in a double sheath, out of which the flower-bud rises about an inch. The sheath is composed of a double row of keel-shaped leaves; the inner row being shorter than the outer, and situated obliquely to it. It is a most singular and beautiful vegetable production, flowering from February to May, and a native of the Cape.

Culture.—This plant is increased by planting the offsets from the roots, in borders prepared for the purpose, in the fronts of the green-house or stove, and covered by frames and glasses in the early spring months. When the plants come up, they require a pretty free air during mild weather, but to be well protected from frost. In very hot weather occasional slight waterings are also necessary.

It is an ornamental plant for green-house collections.

FERULA, a genus comprehending plants of the herbaceous perennial flowery kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal umbel, manifold, globular; partial similar: involucre universal caducous; partial many-leaved, linear, small: proper perianthium, scarcely observable: the corolla universal, uniform: floscules all fertile; proper consisting of five oblong, straightish petals, nearly equal in size: the stamina have five filaments, the length of the corolla: anthers simple: the pistillum is a turbinate, inferior germ: styles two, reflex: stigmas obtuse: the pericarpium an oval fruit, plane-compressed, submargined, marked on both sides with three raised lines, and bipartite: the seeds two, very large, elliptic, flat on both sides, and marked with three distinct streaks.

The species are: 1. *F. communis*, Common Fennel-Giant; 2. *F. glauca*, Glaucous Fennel-Giant; 3. *F. Tingitana*, Tangier Fennel-Giant; 4. *F. Ferulago*, Broad-leaved Fennel-Giant.

The first, in good soils, grows to a great height, and divides into many branches. The lower leaves spread more than two feet every way, and branch out into many divisions, which are again subdivided into many smaller; they are of a lucid green, and spread near the ground. From the centre of the plant comes out the flower-stem, which, when the plants are strong, is nearly as large as a common broom-stick, and ten or twelve feet high, with many joints; there issues from it, when cut, a foetid yellowish liquor, which concretes on the surface of the wound. It is terminated by large umbels of yellow flowers, which appear about the end of June, or the beginning of the following month, and the seeds ripen in September. The roots continue several years, especially in a dry soil, and annually produce flowers and seeds. It is a native of Italy, &c.

In the second species the leaves are composed of many narrow flat segments, of a gray colour, and are divided into many parts. The stem is from three to four feet high, terminated

by an umbel of yellow flowers, appearing in July, and succeeded by oval compressed seeds, which ripen in autumn. It is a native of Spain, &c.

In the third the leaves are large, spreading near the root, of a very lucid green, divided and subdivided into many parts; leaflets much broader than in the other sorts, and divided at the end into three unequal segments. The stems are strong, eight or ten feet high, terminated by large umbels of yellow flowers. It is a native of Spain and Barbary.

The fourth species rises to the height of seven or eight feet. The leaves branch out on every side pretty wide, and the leaflets are broader than those of the other sorts, except the preceding; but they are longer than those, and of a darker green colour, ending in three points. The umbels are large, and the flowers of a yellow colour. It is a native of Sicily.

Culture.—These plants are all capable of being increased by sowing the seeds in the autumn or spring season, on beds of light earth, in small drills, a foot apart, and three inches distant in them. When the plants have attained some growth, they must be well weeded, and properly thinned out. In these beds they may remain for two years, when they should be carefully taken up in the beginning of the autumn, and planted out where they are to grow. They succeed best in such loamy soils as are of a mellow and rather moist quality.

They are hardy, and proper for being planted for the purpose of ornament in the large clumps, borders, and other parts of pleasure-grounds, where they will continue several years.

FICUS, a genus containing a tree of the deciduous fruit kind.

It belongs to the class and order *Polygamia Trioecia*, and ranks in the natural order of *Scabridæ*.

The characters are: that the calyx is common obovate, very large, fleshy, concave; closed with very many semilanceolate, sharp, serrate, inflex scales. The inner surface is covered with floscules, the outer of which, or those which are nearer to the edge of the calyx, are male; these are fewer in number; the rest, lower down, are female, and more numerous: male, each on its proper peduncle: the calyx is a proper perianthium, three-parted, erect (bell-shaped, trifold): divisions lanceolate, erect, equal: there is no corolla: the stamina consist of three filaments, bristle-shaped, length of the calyx: anthers twin: the pistillum has rudiments caducous, intorted: female, each on its proper peduncle: the calyx is a proper perianthium, five-parted (bell-shaped, quinquefid): divisions lan-

ceolate-acuminate, straight, nearly equal: there is no corolla: the pistillum is a germ (half inferior), oval, the size of the proper perianthium: style subulate (bristle-shaped,) inflex, coming out from the germ at the side of the tip: stigmas two, acuminate, reflex; one shorter than the other: there is no pericarpium: the calyx oblique, containing in its bosom a seed, larger: the seed single, roundish, and compressed.

The species are: 1. *F. carica*, Common Fig-tree; 2. *F. sycomorus*, Egyptian Fig-tree, or Sycomore; 3. *F. religiosa*, Poplar-leaved Fig-tree; 4. *F. Bengalensis*, Bengal Fig-tree; 5. *F. Indica*, Indian Fig-tree.

The first is a tree which seldom exceeds two yards in height: the trunk is about the thickness of the human arm; the wood porous and spongy: the bark ash-coloured, full of chinks, and rugged: the branches smooth, with oblong white dots, erect or ascending, fluxuose, and bent back: the stipules in pairs, sessile, ovate, acute, ferruginous, caducous: the leaves annual (in Europe, but within the tropics perennial), cordate, ovate, three- or five-lobed, with rounded sinuses, serrate-toothed, paler underneath, rugged on both sides, spreading, the size of the hand, or a span in length: the petioles are round, grooved, about an inch in length: fruits axillary, solitary, the size of a pear, on very short round peduncles: the flowers produced within the fruit. It is a native of Asia.

There are several varieties, the chief of which are the following:

The *Brown Ischia Fig*, which has a large fruit, short, globular, with a pretty large eye, pinched in near the foot-stalk, of a brown or chestnut colour on the outside, and purple within: the grains large, and the pulp sweet and high-flavoured; it often bursts open as it ripens, in the end of July, or the beginning of August. This fruit ripens well on standards in warm soils.

The *Black Genoa Fig*, which has a long fruit, that swells pretty large at the top, where it is obtuse, the lower part very slender towards the stalk; the skin of a dark purple colour, almost black, and has a purple farina over it like that on some plums; the inside is of a bright red, and the flesh very high flavoured. It ripens early in August.

The *Small White Early Fig*, which has a roundish fruit a little flattened at the crown, with a very short foot-stalk; the skin thin, and when fully ripe of a pale yellowish white colour; the inside white, and the flesh sweet, but not high-flavoured. It ripens in August.

The *Large White Genoa Fig*, which has a large globular fruit, a little lengthened towards the

stalk; the skin thin, of a yellowish colour when fully ripe, and red within. It is a good fruit, but the trees are not good bearers.

The *Black Ischia Fig*, which is a short fruit, of a middling size, a little flattened at the crown; the skin almost black when ripe, and the inside of a deep red; the flesh very high-flavoured. It bears well, and ripens in August.

The *Malta Fig*, which is a small brown fruit, much compressed at the top, and greatly pinched towards the foot-stalk; the skin and inside are of a pale brown colour; the flesh very sweet, and well flavoured. When the fruit is permitted to hang upon the trees till shrivelled, it becomes a fine sweetmeat.

The *Murray, or Brown Naples Fig*, which has a pretty large globular fruit, of a light brown colour on the outside, with faint marks of a dirty white, the inside nearly of the same colour; the grains are pretty large, and the flesh well flavoured. It ripens the latter end of August.

The *Green Ischia Fig*, which has an oblong fruit, almost globular at the crown; the skin is thin, of a green colour; but when fully ripe, stained through by the pulp to a brownish cast; the inside purple, the flesh high flavoured. It ripens about the end of August.

The *Madonna, Brunswick, or Hanover Fig*, which has a long pyramidal fruit of a large size; the skin brown; the flesh of a light brown colour, coarse, with little flavour. It ripens the end of August and the beginning of September.

The *Common Blue, or Purple Fig*, which is oblong; it is a great bearer. The fruit ripens in August.

The *Long-Brown Naples Fig*, which has the leaves deeply divided; the fruit long, somewhat compressed at the crown; the foot-stalks pretty long; the skin of a dark brown when fully ripe; the flesh inclining to red; the grains large, and the flesh well flavoured. It ripens in September.

The *Yellow Ischia Fig*, which has a large fruit, of a pyramidal form; the skin is yellow when ripe, and the flesh purple and well flavoured. It is not a good bearer, but ripens in September.

The *Small Brown Ischia Fig*, which has a small pyramidal fruit, with a very short foot-stalk; the skin of a light brown, the flesh inclining to purple, of a very high flavour. It ripens late in September. It is not a good bearer.

The *Gentile Fig*, which has a middle-sized globular fruit; the skin when ripe, yellow; the flesh also inclines to the same colour; the grains large, and the flesh well flavoured, but it ripens very late, and is a bad bearer.

There are also others, as the Best Early White,

Black Provence, Cyprian, Ford's Seedling, Green Naples, Large Black, Large Blue, Marseilles, Milward, Small Black Ischia, White Ischia, Yellow Caesar.

Those most proper for a small garden, according to Mr. Forsyth, are: the Large White Genoa; Early White; Murray; Small Brown Ischia; and the Black Ischia.

In a good season, he observes, the Brown or Chesnut-coloured Ischia; the Black Genoa; the Small White Early; the Murray, or Brown Naples; and the Common Blue, or Purple Fig, will ripen on standards.

The second species is a large tree, with leaves like those of the Mulberry; the fruit produced from the trunk and large branches, having the shape of the Common Fig, with a slight aromatic sweet taste.

It is here called the Sycomore-tree, and Mulberry Fig-tree. This, and not the Great Maple, is the right Sycomore. It is native of Egypt.

The third, in its native situation, is a large tree, with a short trunk, and very long spreading boughs: the leaves smooth, of a light green, six or seven inches long, and three inches and a half broad towards the base, diminishing gradually to the top, where they run out into a narrow point, an inch and half long; the fruit comes out on the branches, is small, and of no value. It is a native of the East Indies.

The fourth species has a shrubby stem, round, upright, all smooth, a fathom in height; the branches like the stem: the leaves somewhat waved, nerved, the size of the hand, on a semicylindric petiole half an inch in length. It is a native of the East Indies.

The fifth, in its native climate, is a vast tree, entirely smooth, the branches spreading very wide, bowed down, the lower ones rooting, ash-coloured: the leaves acuminate, with a blunt point, obscurely waved, marked with parallel nerves, paler underneath, a span long, on semicylindric ash-coloured petioles of a finger's length: fruits aggregate here and there on the branchlets, peduncled, the size of a hazel nut.

It is known by the name of Banyan-tree. It is a native of the East Indies.

Culture.—The first sort and varieties may be readily increased, either by suckers, layers, or cuttings; but the two last are the best methods, according to Mr. Forsyth.

The suckers should be taken off from the roots as low down as possible, and, after being trimmed, planted out in nursery rows at the distance of two or three feet from each other, with the top entire, to take its natural growth, when intended for standards; but, when for walls, espaliers or dwarfs, in the situations where they

are to remain. In the latter case, they should be cut or headed down to six or eight inches in the early spring, to induce lateral shoots to be thrown out near the ground.

The layers should be made from the well ripened woody shoots of the bearing trees, and be laid down in the autumn, or early in the spring, being protected from frost during the winter by tan or some sort of strawy material. When the plants are sufficiently rooted, as in the following autumn, they should be taken off and planted out in the places where they are to remain, as they do not bear transplanting well, being covered at the roots with dung, tan, or litter during the winter season.

The cuttings of the well ripened woody shoots of the former year, without being shortened, may be planted in the beginning of the autumn in beds of loamy earth in a warm sheltered situation, to the depth of eight or ten inches, protecting them well during the winter with tanner's bark and straw, or some other similar material, the latter being removed as the spring advances. When they have stricken good root in the following autumn, they should be taken up and planted where they are to grow.

These trees are mostly cultivated as standards in warm climates, but in this in general against walls or as espaliers; and only sometimes as standards.

The sorts usually cultivated against walls, are those of the blue and white kinds, but several of the others succeed well in this management.

But for espaliers and as standards, the first, second, third, ninth, and tenth varieties are probably the most proper.

In their culture as wall-trees, they should always be placed in sunny situations for the purpose of the fruit being the most effectually ripened, as in that of a full southern exposure, but an east or west aspect will answer very well when that cannot be had.

In planting them out, where the walls are of considerable height, fifteen or eighteen feet distant may be sufficient; but in low walls twenty or more is not too much space. Mr. Forsyth advises from twenty to twenty-four feet as the most suitable distance for planting these trees.

Where the trees are planted against fire-walls, they should not be kept too close, be drawn by glasses, or have the heat too great, but have at all times, when the weather is favourable, a good share of free air admitted; and if the trees are young, care should be taken that their roots are not extended beyond the reach of the covering; they must be frequently watered when they begin to show fruit, otherwise it will drop off; but old

trees, whose roots are extended to a great distance, only require to have their branches now and then sprinkled over with water. Where these trees are properly managed, the first crop of fruit is greater than upon those which are exposed to the open air, and ripens six weeks or two months earlier, and a plentiful second crop may also be obtained, which ripens early in September, and sometimes in August; but the fires should not be used to these trees till the beginning of February; as, when they are forced too early, the weather is frequently too cold to admit a sufficient quantity of fresh air to set the fruit; but the covers should be put over the trees a month before, to prevent the shoots from being injured by the frost.

The management of the trees in the common method, after they have been headed down or shortened in the manner mentioned above, whether they be on walls or espaliers, is that of training them horizontally, so as to preserve the branches in an equal and regular manner on each side, at the distance of from six to eight inches from each other, and for the most part keeping their full length without any shortening, that as large a proportion of young or bearing wood as possible may be preserved. Some, however, advise their not being laid in so close, considering a foot or eighteen inches as little enough room.

In the pruning of these trees, Mr. Forsyth advises, that it should never be done in the autumn or winter, but in the early spring months. The best time he conceives to be about the latter end of April or beginning of the following month, as by this period it may be ascertained what branches have been destroyed by the severity of the winter. And as the ends of those branches, the wood of which has not ripened well in the autumn, will be most injured, they should be cut into the sound wood, as near to an eye or bud as possible.

In cases where the branches have been permitted to run up so as to leave the bottom in a naked state, every other branch is advised to be cut out as near to the ground as it can be done, by which the walls or espaliers will be provided with good young wood; care being taken to stop the ends of the shoots in summer, as about the beginning of June, in order to induce side-shoots to be thrown out for fruiting the following summer; by which time plenty of fine wood will be provided, and then the remainder of the old branches may be cut out as before, pruning their young shoots as in the preceding case, constantly pinching off the ends of all the strongest shoots at the top bud, except such as are leading ones.

In the spring pruning, as the fruit is produced near the tops, the bearing shoots should

never be shortened, nor should the fine short side and fore right shoots be cut off, except when decayed; as they ripen better than the long strong ones, and are not so apt to be destroyed by frosts in the winter season. By this practice, it is contended that the trees will be covered with fruit from the tops to the bottoms of the wall, &c. instead of having a few only at the top, as is the case in the common method of management.

In summer, as many shoots are sent off, some of those that are irregular and useless may be rubbed off, and the others trained in for the forming of future bearing wood. The proper period for this is about the beginning of June and in the two following months.

After the fruit has attained the size of small nutmegs, the points of the top buds are recommended by Mr. Forsyth to be pinched or cut off with a sharp knife, some of his powdery material being immediately applied, to prevent the oozing out of the milky juice, and the consequent exhaustion and injury of the trees.

In order to prevent the necessity of cutting the trees down in the above manner, they should be covered in winter before the approach of frost, which would destroy the ends of the shoots before the wood was ripened and rendered hard.

Where Fig-trees are greatly injured in the winter, the best practice is to cut them down as near the ground as possible, as in the following year, by the above management, they may be got into a good bearing state.

The best mode of protecting these trees is, according to Mr. Forsyth, to "cover them with bentings, or short grass, from the pleasure-ground, which he finds answers the purpose very well: after it is thoroughly dry, it may be put in a cock, covering it with straw, to prevent the rain from penetrating into it, which would cause it to heat and rot;" or it may be put into a shed. If grass cannot be procured, some dry moss may be employed. In performing the work, "first cover the trees with laurel, yew, fir, or spruce boughs, and then tuck in the short grass or moss among the branches, beginning at the top of the tree, tucking in the grass, &c. as you descend, till you come to the bottom." Fern, when well dried, he says, makes an excellent covering. The trees may be thatched on the outside with the long leaves of the common fern; and where these can be got, there will be no occasion for short grass. When it can be procured, which it may in most country places, it will, he says, be found preferable to laurel.

They "may also be sheltered in winter by wrapping hay or straw bands round the branches of the trees; and then opening the ground, laying

in the branches, and covering them over with mould about nine inches deep, leaving the ends of the shoots about three inches out of the ground, and covering the ground over with some rotten leaves, or old tan, &c. to keep out the frost." The roots of the trees may likewise be covered in the same manner. Where the walls are low, and the borders broad, all the branches may be brought front ways; but when they are high, only the side branches can be brought forward in the above manner. It is the practice of some to cover with reeds and straw; the latter he does not by any means approve of, "as it is very apt to harbour rats and mice, on account of some of the grain being left in it."

In putting on the grass, care should be taken that no mice, &c. have got amongst it; and during the winter, it should be seen that no rats or mice get among the branches of the trees that are covered against the walls; as if they do, they will infallibly bark the branches, and in that case there will be a necessity of heading the trees down.

These may be destroyed by setting traps near the roots of the trees, as soon as they are covered. See TRAPS.

Great care, he says, should be taken, "not to uncover the Fig-trees too soon in the spring; and it should be done partially, as there are frequently frosts and cutting winds in the months of April and May, which will infallibly kill the young fruit as they make their appearance in the spring."

"Those branches which have been laid into the ground should be taken up in the month of April, having the hay or straw bands taken off, and then nailed to the wall. Some fern-leaves, or any other light covering, may be stuck in among the branches, to protect them from the drying winds and frosts, till the fruit comes to the size of a large walnut, or rather till the leaves are sufficiently large to protect the fruit."

It is observed, that "the Italians, when they wish to forward the ripening of Figs, drop in a little sweet oil, from a quill, into the eye of the fruit; but care must be taken not to hurt the skin, which will make the Fig burst. This will make a difference at least of a fortnight in the ripening."

It is also recommended, "as soon as the leaves begin to fall, to brush them off with a broom, but by no means till they will come off easily. If they are forced off before they begin to wither and decay, the trees will bleed at the foot-stalks. At the same time the stalks should be cleared of all the small late fruit, which, if suffered to remain during the winter, will rot, and

injure the tree so as to prevent it from bearing the ensuing summer. If any milk be observed oozing from the foot-stalks, a little of the composition should be used, which will stop it, and heal the injured part. See COMPOSITION.

By doing this, the ripening and hardening of the wood will be assisted before the winter frosts set in.

In standard-trees of all sorts, little pruning is necessary, only just to take out the very irregular branches and the young shoots when too much crowded, and the dead ends of the shoots, as well as any dead wood that there may be in them.

Mr. Forsyth, however, observes that, "as the branches of standard Fig-trees are very liable to be killed in severe winters, it will be necessary to lay them also in the ground, wrapping them up in hay or straw bands, as directed for wall-trees. It will be sometimes impracticable to lay down the middle branches; they must, therefore, be well covered with hay or straw bands, and the outside ones laid down, going regularly round the tree, and taking particular care not to hurt them with the spade, then to mulch them with rotten leaves, &c."

Where Mr. Forsyth has been under the necessity of cutting Fig-trees down near to the ground after hard winters, he has found, by the use of his composition, that "in the course of two years, the new wood has covered over the old stump, and the branches filled up the former space, bearing also plenty of fine fruit."

The other species are easily propagated by cuttings during the summer season. When the cuttings are taken from the plants, they should be laid in a dry shady place for two or three days, that the wounds may be healed over, otherwise they are apt to rot; after which they should be planted in pots filled with sandy light earth, and plunged into a moderate hot-bed, where they should be shaded from the sun, and two or three times a week gently refreshed with water, if the season is warm; but they must not have too much moisture, as it would infallibly destroy them. When the cuttings have taken root sufficiently, they should be each planted into a separate small pot filled with light undunged earth, and replunged into the hot-bed, shading them until they have taken fresh root; then they should have a large share of free air admitted to them at all times when the weather is favourable, to prevent their drawing up weak, and to give them strength before the cold comes on. In autumn the pots should be removed into the stove, and be plunged into the tan-bed, where they should constantly remain, and be treated in the same manner as other tender plants from the same

countries; for although two or three of the sorts may be treated in a hardier manner, yet they will not make much progress. They may likewise be increased by layers.

They are shrubs in this climate which afford variety in stove collections.

FINOCHIO. See **ANETHUM**.

FIR-TREE. See **PINUS**.

FLAG COMMON. See **IRIS**.

FLAG SWEET. See **ACORUS**.

FLOS ADONIS. See **ADONIS**.

FORCING, the art of raising and producing plants, flowers, and fruits by means of artificial heat. It is accomplished, either by the gentle moist heat that is evolved during the fermentation and decomposition of stable-dung, tanner's bark, and other similar materials, or by the use of actual fire in stoves, flues, and other contrivances for the purpose.

The former of these methods is principally employed in raising Cucumbers, Melons, and some other fruits, and the latter in producing Pine Apples, various kinds of wall-fruits, and several other sorts of vegetable productions.

The great difficulty in the management of this process, is that of adapting and regulating the heat, of whatever sort it may be, in such a manner as to promote and bring forward the plants in the most perfect and healthy growth, without their sustaining injury either by a deficiency or excess. The various methods of effecting this in the most perfect manner are fully described under the culture of the different trees, plants, and vegetables that require such treatment in their cultivation.

It is by this process that different sorts of vegetable productions, fruits and flowers are afforded at much earlier periods than could otherwise be the case, and it of course constitutes an important branch of practical gardening.

FORCING-FRAME, that kind of large framework or erection which is made use of in procuring different sorts of vegetables, fruits, and flowers at an early period, by the application of artificial heat in some of the above modes. It is a sort of construction covered with sloping glass sliding frames on the top, and sometimes in the front. It may be either fixed or moveable, but in the former case the walls are mostly made of brick work.

These sorts of forcing-frames are usually placed full to the south sun, and the length may be from ten to fifty or one hundred feet; the width from five to fifteen, and from five to ten high; having an upright back wall, of wood, where small, but when large, of brick; and a front of glass-work, made sometimes in one continued range of slope to the top of the back wall; and sometimes with

upright glass-work, head high, ranging immediately along the front, and from the top of which a glass roof is carried to the top of the back or main wall: when wrought by dung-heat, it is chiefly applied against the outside of the back wall, and by being formed into a bed internally: when by bark-heat, by forming it into a bed in a pit within-side; and when by fire-heat, by having several returns of flues against the inside of the back wall, and that of the front and both ends, for the heat to pass along, constructed according to the sorts of plants chiefly intended to be forced, and the nature of the materials to be employed in producing the heat.

Where the first kind of material is employed in affording heat, the frame is usually formed with an upright back and ends of deal planking, and a sloping front of moveable glass-lights; the length may be ten, twenty, or thirty feet, or more; the width, from three to five (or more), and five or six high; the frame work should be of inch-and-half deal planking, tongued, and closely joined, that no steam from the dung may penetrate into the frame; raised five, six, or seven feet high behind, and only ten or twelve inches high in front, raising both ends answerable to the front and back; the glass-work to range, from the upright in front, sloping upward towards the back wall, to about a foot width at top, there resting the ends upon proper frame-work of wood; and bars or bearers, three inches in width, ranged sloping from the back to front, for the support of the lights, as in common hot-bed frames, and the top of all boarded wind and water tight; having sometimes within-side two or three ranges of narrow shelves along the back and ends, for pots of small plants, and the bottom levelled, on which to place pots of larger kinds; or shelves may be made rising one behind another quite from the front half way up the back wall, in order to place the lowest plants in front, the others in order behind them, rising gradually to the tallest in the back rows.

In working these frames; after having placed the pots of plants in regular order, the lights are put on, and a sufficient quantity of fresh hot stable-dung, prepared as for common dung hot-beds, is to be piled up close against the outside of the back and ends, a yard wide at bottom, drawing it gradually into a foot width at top, finishing it somewhat sloping, to throw off wet; and as the dung settles or sinks down, a fresh supply must be added at top, to maintain the lining to the full height of the frame, additions being occasionally made of fresh dung as the heat declines; by this means a fine growing heat will be thrown in. See **HOT-BED**.

Where bark is made use of in producing

heat, the frame may be constructed either of wood or brick-work, and fronted, &c. with sashes of glass as the former; the length may be ten, twenty, or thirty feet, or more; eight or ten wide, and six or eight high; and, like the dung-heat frame, be six or eight feet high behind, and one in front, the ends conformable and sloping, having glass-work frames raised from the front, sloping either quite to the top of the back wall, or inclined only about one half towards that part; meeting a tiled roof at top half way, which should be raised high enough in front to throw the water off behind, as well as to admit as much sun as possible to every part of the frame: it may likewise be constructed with an upright front of glass, head high, and a sloping roof of glass-work, ranging from the upright front to the top of the back wall, which is the most eligible form, both for convenience and benefit of the plants; either of which constructions may be erected detached, or against a south wall already built, which will serve for the back, and save some expense; the ends may either be of wood or brick, and should be glazed like the front, &c. and the glass-work in every part be made to move on and off, as well as to slide backward and forward to give air, and perform other necessary work. At one end, near the back wall, a door should be made to enter occasionally at, and within-side a pit formed for the bark-bed, three feet deep, part sunk, the greater part raised, continued the whole length and width, except about a foot and half alley to pass in to perform the necessary culture, as well as view and gather the produce of the different plants.

The pit within is to be filled with new tan in order to afford a proper heat for the growth and support of the plants that are to be cultivated. See **HOT-BED**.

Where fire-heat is to be employed, the frame must be formed of brick-work, at least the back or main wall, for the convenience of having fire-flues, and the whole front, &c. be glass like the other sorts; the length may be from twenty to forty or fifty feet, or more, though one fire will not warm more than that length; the width from five or six to twelve or fifteen feet, and eight or ten high. In this case the fire is burned in a furnace behind at one end or middle, thence communicating the heat by internal flues or funnels running the whole length of the back wall in three or four returns one above another, and continued in one or two flues in the front. And frames thus constructed may be contrived either of moderate width for one row of trees only, to range against the back wall, or may be capacious enough to have a range of trained wall-trees behind, and some small

half or full standards, ranging also from the back to the front, or entirely for standards, especially those of cherries.

Where it is intended to have a narrow frame for only a row of trained trees behind, the width of from four to five or six feet is sufficient, having the back or main wall formed of brick or stone, as just observed, eight or ten feet high, with several flues within-side, returned over each other, running the whole length of the wall; in the front must be a low wall a foot high, on which to lay a plate of timber, and from which are ranged glass frames or lights in one continued slope to the top of the back wall, there received into proper frame-work; but for the greater convenience, the lights may be in two tiers or ranges, an under and upper tier, the upper range made to slide up and down over the others, but so that all the glass-work can be moved away occasionally, to admit the full air to the trees after the work of forcing is over: the whole bottom-space within the frame should be of good loamy earth, or any good garden mould, two spades deep, which should be dug or trenched in the common way; then a range of trees planted behind, towards the wall, two or three yards asunder, erecting a trellis behind them, upon which to train the branches as against a wall or espalier. Other inferior plants may likewise be set in the border or in pots, in front of the trees.

In forcing-frames of this construction, from forty or fifty feet long may be sufficient; but if longer, two furnaces for fires are necessary. See **HOT-HOUSE**.

Different sorts of frames of this nature may be seen in the plates on **FORCING-FRAMES, HOT-HOUSES, &c.**

In the first sort of forcing-frame, various kinds of fruits may be produced both of the dwarf fruit-tree and other kinds, as well as different sorts of vegetables and plants of the flowery and other kinds.

Frames of this sort may have such dimensions as to have substantial hot-beds prepared within them, for the purpose of receiving many different sorts of potted plants.

And in the second sort of frame, from the heat being more regular and lasting, a still greater variety of the finer sorts of fruits, and the more tender flowers and other vegetable productions may be produced, not only long before they could be raised in any other way, but with much greater ease and convenience, as well as with greater certainty.

The last kind of forcing-frame is employed in furnishing many of the finer sorts of fruits, that require higher degrees of heat to procure

them in the utmost perfection, such as pine-apples, grapes, apricots, peaches, nectarines, and various others, as well as many tender sorts of vegetables, and numerous plants of the curious flower and other kinds.

FORCING-GROUND, the portion of ground in a garden that is destined to the purpose of forcing or raising vegetable productions by means of artificial heat. Grounds of this sort should always be detached from the garden, and situated as near to the stable as the nature of the land will admit, in order that dung may be conveyed to them with as much ease and convenience as possible, litter prevented, and the disagreeable appearance of the beds concealed.

It is necessary in most situations, and particularly in such as are exposed, to have them inclosed with a fence, either of brick-work or paling, six or eight feet in height. They should have sufficient space for containing a suitable number of frames and pits, and such linings as may be necessary in the working of them. And it is of great advantage in raising many sorts of tender crops, both of the vegetable and fruit kind, to have four- or six-foot borders made round them, in a raised manner.

Where melons are raised, it is usual to have brick pits coped with stone or wood. Those which are most convenient, according to Mr. Forsyth, are such as are about twelve feet in width and two and a half in depth; the length in proportion to the number of frames employed. They are, however, often made of much smaller dimensions, especially where the extent of forcing-ground is but small.

In regard to the size of the lights for early melons, the above author advises, that they should be five feet in length and three in breadth; and for others, six feet in length and four in breadth, the former being four- and the latter three-light boxes. See **FRAME**.

In constructing the pits, nine-inch walls will be sufficient, square spaces of wood being built in the upper parts of them, where wood copings are made use of, to nail them to. As wood decays rapidly, stone should be preferred. Sometimes the walls are not built solid, but square openings left, so as to admit the heat from the outsides. See the plate annexed.

Mr. Forsyth directs, that there "should be a walk between the ridges about six or seven feet broad, sufficient to admit a cart to carry dung," as being more expeditious than wheeling it in. "The walk should be made up as high as the coping, and sloping gently towards each end," being laid in the bottom with brick rubbish, and covered over with sea-coal ashes or sand. By

this means, after the linings are made up, it may be kept perfectly neat and clean. A loose drain will likewise be necessary in the middle of the bottom of the pit, for conveying off wet and the oozing from the dung, to a tank or cistern constructed for its reception. The fluid thus collected, may be made use of in watering cabbage and other plants of the same kind.

FORCING-PIT, a sort of pit constructed of brick-work, with fire-flues, in various ways, for the purpose of making tan- or other hot-beds in being covered with glass frames.

It is useful for receiving different sorts of tender potted plants which require considerable degrees of heat in their cultivation. See **BAK-PIT**.

FORCING-WALL, a wall constructed with flues for the purpose of conveying and communicating fire-heat, in order to ripen various kinds of tree fruits that are planted and trained against them, and which are protected in the front by glazed frames. See **HOT-WALL**.

Walls of this sort should always be erected in warm sheltered situations, and have southern aspects, in order that they may derive the greatest possible advantage from the influence of the sun.

FOREST-TREES, such trees as grow to a large size, whether of the deciduous or evergreen kinds, and are fit for the purpose of timber. Of this sort of trees there are a great many different kinds; but those principally employed as timber are: the Oak, Ash, Elm, Beech, Chestnut, Maple, Birch, Alder, Poplar, Larch, Pine, &c. And for the purposes of ornament, these as well as many others may be had recourse to; such as the Mountain-ash, Lime, Horse-chestnut, Willow, &c. and all the different sorts of Fir, Box, Holly, Yew, Cypress, &c.

They are raised in different methods according to their kinds, as may be seen under their respective genera, but chiefly by seeds, layers, and cuttings.

In forming plantations with these sorts of trees, whether by sowing the seeds or setting the young plants, great care should be taken to adapt them as much as possible to the nature of the soils and situation, as some sorts succeed well on one kind of soil and others on another. Thus the Oak, Elm, Maple, and Birch, answer well on all the deeper kinds of soil; while those of the Ash, Beech, Chestnut, Mountain-ash, Larch, Pine, Box, Holly, Yew, &c. thrive the most perfectly where the soils are more light, dry, and friable. But the Alder, Willow, Poplar, and some others, grow in the greatest perfection where there is a greater degree of moisture. The Beech, Mountain-ash, Larch, and some others, likewise succeed well in exposed situations. See **PLANTATION**.

FOSSE, a sort of sunk fence or haw-haw made

on the outsides or boundaries of ornamented grounds, in order to extend the prospect in an uninterrupted manner. Fences of this nature are formed of different depths and breadths, according to circumstances, but six or seven feet in depth and ten or fifteen in width are the most common. Where the extent of pleasure-ground is inconsiderable, these fences give the particular parts of the garden or grounds an air of larger extent than it really possesses, as at a distance nothing of them is seen, so that the adjacent fields, &c. appear to be connected with them: where the pleasure-ground is situated near to a park, paddock, or any spacious field open to an agreeable prospect, they are often continued round, as far as they are agreeable from the walks of the pleasure-grounds.

Works of this kind are formed in different ways, but always so as to serve the purpose of fences and afford an uninterrupted view.

One method of constructing them is with an upright side next the garden or pleasure-ground, or in the contrary direction, according to circumstances and situation, five, six, or seven feet deep, faced with a wall of brick, stone, or strong post and planking; the other side being made sloping outward from the bottom of the upright wall, &c. gradually, with an easy slope to fifteen or twenty feet distance, or more, so as to render the declivity as easy and imperceptible as possible, both to take off all stiff and ditch-like appearance, and that when in a field or park, no ground may be lost from its being capable of being converted into grass. The top of the upright side should be made nearly upon a level with the adjacent pleasure-ground, and always a little higher than the top of the slope on the opposite side, being laid with grass, corresponding to the adjoining garden or pleasure-ground, unless it be thought convenient to continue a gravel walk that way; in which case, a proper verge of grass should constantly be preserved between the walk and the edge of the fosse; the sloped side should also have its top always nearly on a level with the adjacent ground of the field, park, or part where it is formed; and the side finished with a regular slope from top to bottom, being also sown or laid down in grass, which will always preserve the slope in due form, and have an agreeable appearance to the sight.

When, in forming this kind of fosse, by reason of wet it cannot be got deep enough to form the upright sufficiently as a fence, a chevaux-de-frise of wood-work may be erected along the top, projecting outward in a nearly horizontal position, or as much so as to rise but very little above the level of the top of the perpendicular side on which it is fixed, that it may not obstruct the

view, or be very perceptible from the garden or pleasure-ground.

Another fence of this sort is formed with both sides sloping, and in perpendicular depth from four to five or six feet, having a fence near that height arranged along the bottom; the sides being sloped gradually from the bottom to ten or twenty feet width, or more, at top; as the more easy and imperceptible the slope the better, particularly on the field side. The sides must be sown or laid with grass. In this, as both sides are sloped, a fence along the bottom is necessary as a defence against cattle, &c. which may be either strong paling, or any kind of palisado-work, the height in proportion to the perpendicular depth of the sunk fence, as the top should not be higher than that of the slopes.

In constructing the first sort of fences of this nature, begin by setting out the intended width by two ranges of short stakes; then level in the stakes by notching, according to the intended height of the top on each side, corresponding with the adjacent ground, making up both the top lines with earth firmly, according to the line of level marked on the stakes; then close along the side of the line of the intended upright side, proceed to dig a trench three feet wide, perpendicularly to the intended depth; and as you go on, work also the sloping side gradually down, still continue digging the trench perpendicularly next the garden, &c. till arrived at the proper depth; when level the bottom equally along according to the lines of level at top; and having proceeded so far, then, according to the line of level at top and bottom, trim and finish off the sloping side regularly, so as to form an even slope from the outside line at top to that at bottom: as to the upright side, a wall must be erected to the height of the line of level at top, making good the ground behind the wall, firmly, as the building advances, and finishing the top with a coat of turf level with the adjoining ground; at the same time also finish the slope, either by sowing it with grass-seeds, or laying it with turf, as most convenient.

In forming the second sort, set out the width by two lines of stakes; then level them in, and make up the ground of each line according to the mark of level, as before; then exactly along the middle, between the two lines of stakes, dig a trench two or three feet wide, to the intended depth of the fence, sloping each side a little as you go on, still continuing the trench perpendicularly, till arrived at the due depth; then, as in the former, level the bottom an equal depth, by stakes, agreeable to the lines of level at top; when this is effected, finish off both

slopes evenly from each line of level at top to that at bottom, and sow each slope with grass, or lay them with turf, as most proper. The fence along the bottom may be either close paling, rails, or palisadoes, as most convenient; the height proportionable to the depth of the fosse, but not higher, or at least but very little, than the line of level at the top of the fosse.

In the execution of the work in both cases the internal materials should be well trodden or rammed in, in order that the whole may be rendered perfectly solid, and prevented from sinking irregularly.

FOTHERGILLA, a genus containing a plant of the low under shrubby kind.

It belongs to the class and order *Polyandria Digynia*, and ranks in the natural order of *Amentacea*.

The characters are: that the calyx is an one-leaved perianthium, bell-shaped, close, truncate, short, permanent: there is no corolla: the stamina have very many filiform filaments, thicker at top, long: anthers minute, erect, quadrangular: the pistillum is an ovate, bifid germ: styles two, subulate, terminating, the length of the stamens: the pericarpium is a hardened, two-lobed, two-celled capsule: lobes two-valved: the seeds solitary and bony.

The species is *F. alnifolia*, Alder-leaved *Fothergilla*.

It is a tree having the appearance and leaves of Alder. The leaves are alternate, petioled, wedge-shaped, entire, serrate at the tip, serratures very large and few, the upper surface green, the lower hoary, the younger ones white with nap underneath. The flowers in a close spike at the end of the stem, like an oblong head, and white. Capsules large, ovate, very hirsute, sharp, two-celled: the valves opening into four points, until the seeds are ripe. The flowers come out in the beginning of spring from the buds at the end of the branches before the leaves, and are of a white colour. It is a native of North America, flowering from April to June.

There are varieties of it, with broad leaves, and with narrow leaves.

Culture.—These plants are raised with facility, by parting the roots in the autumn or spring season, and planting them out in the places where the plants are to grow.

They afford ornament and variety in the fronts of the borders and clumps in pleasure-grounds, among others of similar growth; and from their hardy nature require little trouble.

FOX-GLOVE. See **DIGITALIS**.

FRAGARIA, a genus comprising a plant of the low herbaceous perennial hardy fruit kind.

It belongs to the class and order *Icosandria*

Polygynia, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is an one-leaved, flat, ten-cleft perianthium: divisions alternately exterior and narrower: the corolla has five petals, roundish, spreading, inserted into the calyx: the stamina have twenty subulate filaments, shorter than the corolla, inserted into the calyx: anthers lunular: the pistillum has numerous germs, very small, collected into a head: styles simple, inserted at the side of the germ: stigmas simple: there is no pericarpium: common receptacle of the seeds (vulgarly called a berry) ovate, pulpy, soft, large, coloured, truncate at the base, and deciduous: the seeds numerous, very small, acuminate, scattered over the surface of the receptacle (a little compressed, smooth, glittering).

The species cultivated is *F. vesca*, Esculent Strawberry.

It is distinguished by its thick fibrous root, the long slender runners which it throws out from it, which at the joints strike root and form new plants, by its ternate leaves, and its remarkable fleshy receptacle, commonly called a berry, but having the outer surface studded with seeds. The flowers are small and white, on slender stems, six or seven inches in height.

There are several varieties cultivated, of which the following are the principal.

The *Wood-Strawberry*, which has the leaflets oval-lanceolate, acutely serrate; the petioles woolly; the runners slender, smooth, often tinged with purple: peduncles with two or more flowers. The fruit small, and usually red: it has commonly little flavour here, from the plants being too much shaded in woods and hedges.

The sub-varieties of which are: the *White Wood-Strawberry*, which ripens a little later in the season, and is often preferred to it for its quick flavour, but as it seldom produces such large crops of fruit as the red sort, it is not so generally cultivated.—The *Alpine Strawberry*, which is a larger plant than that which grows in woods, the stem higher, the leaves broader, the fruit larger, red, and usually much pointed, sometimes white. It is well flavoured, and the plants continue long in bearing, which renders them very valuable. The reason of this is, that the runners which it throws out during the summer shoot up into flower and fruit the same year more freely than in the other sorts. It is sometimes termed *Everlasting Strawberry*.—The *Rough-fruited* or *Prickly Strawberry*, which Martyn thinks nothing but an accidental variety, has the flower greenish; the fruit harsh, rough and prickly, of a greenish colour with some show of redness.

The *Hautboy Strawberry* is very different from the rest in leaf, flower, and fruit. The leaves are larger, thicker, hairyish, and rough. The fruit very large, and of a pale red colour. It varies with oval, pine-shaped, and green fruit; with red blossom, with white striped leaves, and with yellow striped leaves.

There is also an improved sub-variety of it, called *Globe Hautboy*; the fruit of which is larger, and of a globular form. Martyn observes that "where these are neglected, they degenerate to the Common Hautboy; but where the soil is good, and the culture well managed, the plants will produce a great quantity of large well-flavoured fruit."

This variety of Strawberry is very apt to degenerate, and to produce only dry effete fruit; which, according to Mons. Duhamel, is owing to there being two sorts of plants, one bearing male, the other female or rather imperfect hermaphrodite flowers, the former of which, being reputed useless, are carefully destroyed; hence not only the seeds become abortive, but the receptacle, commonly called the fruit, small and juiceless. This Martyn thinks "may be remedied, either by planting a few of the male plants, or of the Scarlet or Pine Strawberry among the Hautboys."

The *Chili Strawberry* has the leaves hairy, oval, and of a much thicker substance than any sort yet known, and stands upon very strong hairy foot-stalks; the runners from the plants are very large, hairy, and extend to a great length, putting out plants at several distances. The peduncles are very strong; the leaves of the calyx long and hairy. The flowers are large, and often deformed; and so is the fruit, which is very large. When cultivated in very strong land, the plants produce plenty of firm well-flavoured fruit; but as it is a bad bearer in most places, it has been lately less cultivated.

According to Frezier, the fruit usually attains the size of a walnut, but is sometimes as large as an egg, of a paler red than the European Strawberry, and not so quick in its flavour. It deserves cultivation for the singularity and size of the fruit.

It varies with round pale red, with globular pale red, with oblong-oval pale red, and deep red fruit. There is also Carolina scarlet and white fruited; Royal large red; Large Dutch, Bath, and Devonshire Chili Strawberry.

The *Scarlet Strawberry*, which is the sort first ripe.—The fruit is good, being preferred to most others by many. It was brought from Virginia, where it grows naturally in the woods. It is very different from the Wood-Strawberry, in leaf, flower, and fruit. The leaves being of

a dark green and of a more even surface, the flowering-stems shorter, the fruit being frequently concealed among the leaves.

It varies with roundish leaves, and with striped leaves.

The *Pine Strawberry*, in which the leaves have a great resemblance to those of the Scarlet Strawberry; but are larger, of a thicker substance, and the indentures of their edges blunter; the runners are much larger and hairy; the peduncles are stronger, the flowers much larger, and the fruit approaches in size, shape, and colour to the Chili Strawberry. It produces a great quantity of fine large fruit, when the plants are kept clear from runners.

According to Mons. Duhamel, it is raised from the seed of the Chili Strawberry. The flower is very large, and the fruit has something of the smell and taste of the Pine-apple. It varies in the form of the fruit with ovoid, with oblate spheroid, and with irregular fruit. It is much smaller than the Chili Strawberry. There are also the Green, Red, and Hautboy-fruited, as well as the Chili Pine-apple Strawberry.

The *Carolina Strawberry*, which greatly resembles the above, but is much less in all its parts, and less hairy: the flower-stems are shorter: the flower-buds more lengthened out, and less swollen: the fruit smaller, more regular in the form, of a higher colour, but the perfume not so pleasant. Martyn remarks that "the Pine varies little when raised from seed, whereas this varies much in the flower, fruits, &c."

Culture.—In order to raise this sort of fruit to the greatest advantage and perfection, the soil should be of the friable loamy kind, with a moderate degree of moisture.

All the different varieties may be made use of where large supplies are wanted; but in other cases a few of the small and large sorts may be sufficient. The same varieties should always be planted together in separate beds, or other places, but never any mixture of different sorts admitted.

The usual practice in forming beds of this sort of fruit is by planting out the offsets taken from the sides of the old plants, or such as are formed from the rooting of the joints of the runners; but the former are in general the better plants. And in choosing them, they should never be taken from such plants as are old, and which have been neglected in their culture, but constantly from such as have been well kept in order, and are in a full bearing state; such offsets as stand nearest to the old plants being preferred to such plants as are formed by the trailing stems at a distance. Upon a careful attention to these circumstances much of the success of this sort

of culture depends. In some of the varieties, as those of the wood kind, the offsets are best when taken from the wild bearing plants; as they are not so liable to run as those taken from the cultivated sorts.

These offsets or plants are mostly of sufficiently strong growth the first year for being made use of; but when this is not the case, they may be set out in nursery rows till they have attained a full growth.

In preparing for plantations of this sort, the ground should be well trenched over and effectually cleared from all sorts of weeds, and after being laid quite level, formed into beds four feet in width, with paths of two feet or two feet and a half between them, for the convenience of cultivation and gathering the produce. The situation should be quite open, and have as much as possible a southern aspect. It is likewise a great advantage when the beds can be formed in a shelving or sloping manner towards the south, so as to have the full influence of the sun.

When the beds have been thus made up, they are in a proper state for being planted upon.

The most suitable time for performing this business is in the early autumn, as about the latter end of September or beginning of the following month, in order that the plants may be well rooted before the commencement of the winter frosts. Some, however, plant in the early spring; but there is more danger of the plants being destroyed by the heat of the summer.

In executing the work, the plants or offsets should be put in by means of a line and dibble, in rows lengthways of the beds, at different distances, according to the kinds.

The most usual distances are, for the wood sort twelve or fifteen inches each way; and eighteen inches for the Scarlets, Hautboys, Chili, Alpine, and other large kinds. Much advantage is always gained by letting them have sufficient room. It is usual to set them out in the quincunx order, and great care should be taken in the work of planting, to close the mould well to the roots of the plants as they are set out. When the whole has been done, they should have a good watering to settle the earth well about their roots.

But besides this mode of planting upon beds, they succeed well on the fronts of clumps, borders, and other parts of pleasure-grounds, especially when set so as to have a due degree of sun, and without being too much shaded.

When new varieties of this sort of fruit are wanted, the propagation must be effected by sowing the seed produced on the fruit, when

perfectly ripened, either in the spring or autumn season, on a bed of light earth, or in pots placed in the shade.

After the plants have been set out as above, and taken new root, care is necessary, if the winter prove severe, to lay some old tanner's bark over the surface of the bed between the plants, to keep out the frost: this is absolutely necessary in the Chili sort, as the plants are frequently killed in hard winters when exposed without any covering: where tanner's bark cannot be easily procured, saw-dust, or sea-coal ashes may be used; or even the decayed leaves of trees, or the branches of evergreen-trees with their leaves upon them laid over the beds.

In the following summer the plants should be constantly kept clean from weeds, and all the runners be pulled off as fast as they are produced; as where this is constantly practised the plants become very strong by the following autumn; but when neglected, and the runners permitted to stand during the summer, and then pulled off in the autumn, they are not half so strong, nor will there be near the same quantity of fruit upon them the following spring, or so large and fine. Where proper care is taken of the plants the first summer, there is generally a plentiful supply of fruit the second spring after planting.

When the plants are in blossom, if the weather prove dry, good waterings given occasionally prove very beneficial in promoting a plentiful production of fruit, but in other cases it is unnecessary.

In the general culture of this sort of fruit, as the old plants are those which produce the fruit, the suckers seldom affording any till of a full year's growth, it is obviously necessary to divest them of them, as when suffered to remain they rob the fruitful plants of their nourishment in proportion to their number; and, besides, the suckers render each other weak, and thus cause barrenness. In the Alpine sorts the summer runners should not however be removed as they produce fruit.

Where the old plants are constantly kept clear from suckers, they sometimes continue fruitful four or five years without being replanted. It is, however, a good way to have a succession of beds, that after three years standing they may be taken up, as by that time they have mostly exhausted the ground. This sort of plants are also in general more productive on new land.

After having been thus cut and managed in the summer season, it will be necessary in autumn not only again to divest them of these strings or runners, but of all the decayed leaves, and to clear the beds from weeds; then the paths

should be dug up, and the weeds buried, some earth being laid over the surface of the beds between the plants, which will strengthen them and prepare them for the following spring; and if after this there be some old tanner's bark laid over the surface of the ground between the plants, it will be of great service to them. In the spring, when the danger of hard frost is over, as in March, the ground between the plants in the beds should be forked over with a narrow three-pronged fork, to loosen it and break the clods; and in this operation the tan which was laid over the surface of the ground in autumn will be buried, and be a good dressing to the Strawberries, especially in strong land. This should be done whether the plants are in distinct bunches or in large beds.

And about the beginning of April, Martyn observes "if the surface of the beds be covered with moss, it will keep the ground moist, and prevent the drying winds from penetrating the ground, and thereby secure a good crop of fruit; and also preserve the fruit clean, that when heavy rains fall after it is full grown, there will be no dirt washed over them, which frequently happens, so that it must be washed before it is fit for the table, which greatly diminishes its flavour."

It is of great utility in dry seasons to water occasionally every summer, while the plants are in blow and forming their fruit; but as it approaches maturity this should be left off, as it injures the flavour.

And in some of the more fine sorts, or curious large varieties, when ripening, it is eligible either to tie up the stalks with the bunches of fruit thereon to sticks, or the leaves and stalks together; so as, in either way, to elevate the fruit from the earth, more out of danger of rotting by wet in a rainy season, and to more effectually enjoy the full sun to ripen with a good flavour; or sometimes place flat tiles on the ground round each plant of a few particular sorts, for the fruit to rest upon, drier and more secure from rotting by the damp of the earth, and to ripen with an improved flavour by such means.

As the fruit ripens in June and the following months, it should be gathered daily; being plucked off in the cup, with about half an inch of the stalk adhering, by which means they are not so liable to be bruised, and appear more conveniently when served at table, and are more agreeably picked up out of the dish or basket for eating. The Wood-strawberries are however very commonly gathered without any stalky part, being generally picked clean out of their cups, especially when designed to eat with cream, &c.

Culture in Hot-houses, &c.—Besides the above method of raising this sort of fruit in the natural ground, it may be brought to perfection at a much earlier period by forcing in hot-houses, glass-frames, against hot-walls, and under common dung or bark hot-bed frames, &c.

The sorts most suitable in this intention are the different smaller sorts, as the *Scarlet*, the *Alpine*, and the *Wood Strawberry*. The *Hautboy* grows too large for this purpose.

In providing sets, great care should be taken to have them from the most fruitful plants, and those which grow immediately to the old plants; they should be taken off in autumn, and each planted in a separate small pot filled with loamy earth, being placed in a shady situation till they have taken root; after which they may be removed to an open situation till the middle or end of November; when the pots should be plunged into the ground up to their rims, to prevent the frost from penetrating through the sides. When placed near a wall, pale, or hedge-fence, exposed to the east or north-east, they succeed better than in a warm situation, as they are not forced too forward; after this they only require to be secured against frost.

In the spring following the plants will have filled the pots with their roots by the end of April, when they should be turned out of them and their roots pared, and replanted into penny pots filled with the like loamy soil, and replunged into the ground, in a shady situation, to remain till the following summer; during which time they must be kept clean from weeds, and have all the runners taken off as fast as they are produced. And if there should be any flowers produced, they should be pinched off, in order to have the plants as strong as possible.

Towards the end of October, or earlier if the season prove cold, the pots should be removed into a warmer situation, to prepare them for forcing; as they should not be suddenly removed from a very cold situation into the stove or hot-bed, but be gradually prepared for it. Where they are designed for the borders near hot-walls, they may then be turned out of the pots and planted, that they may have time to get fresh rooted before the fires are made to heat the walls; and they may be placed very close to each other, as they are designed to remain there only till they have ripened their fruit.

When the fires are lighted about the latter end of December, the strawberries in the borders will be ripe the end of March; but if the season should prove very cold, it will be the middle of April before they are fit for the table.

When intended to be forced in a pine-apple stove, and there is not room to plunge them in the tan-bed, the plants should be transplanted into larger pots in September, that they may be well rooted before they are removed into the stove, which should not be till December.

If placed under a frame the beginning of November, to be screened from frost, it will prepare the plants better for forcing. And where wanted early, a hot-bed should be made under frames, upon which the plants are put in the latter end of October, by which they are brought forward to flower, and then removed into the stove, being placed as near to the glasses as possible, to have the full influence of the sun and air; as when placed to the back the plants draw up weak, and the flowers drop without producing fruit.

In the management of the plants in the first mode, there must be care taken to supply them with water when they begin to show their flowers, otherwise they will fall off without producing fruit; and, in mild weather, fresh air should be admitted to them every day. And in the stove method, as the earth in the pots will dry pretty fast when they stand upon the pavement of the hot-house, or on shelves, they must be duly watered; but not too much given at a time, which would hurt them.

Where properly managed, they produce ripe fruit in February.

When the fruit has been wholly gathered from the plants, they should be put out of the stove, and from the borders near the hot-walls, that they may not rob the fruit-trees of their nourishment.

There is another method of ripening this fruit early, which is on hot-beds, where there is not the above conveniences. The plants are prepared in pots in the above manner, and placed in a warm situation in the beginning of October: about December the hot-bed is made in the same manner as for Cucumbers, but not so strong; and when the first violent steam is over, some old rotten dung, or, what is better, neat's dung, laid over the hot-bed to keep down the heat. The plants should then be plunged in the pots into the bed, as close together as possible, filling up the interstices between them with earth. They must afterwards have air admitted to them every day; and, if the heat of the bed is too great, be raised up, to prevent their roots being scorched. But when too cold, the sides of it should be lined with some hot dung. This bed brings them to flower by the end of February, or the beginning of March, when another mild hot-bed must be prepared to receive them. Upon the hot dung some neat's dung about two

inches thick, being spread equally to prevent the heat from injuring the roots of the plants, and upon this two inches of a loamy mould; when this has lain two days to warm, the plants should be taken out of the first hot-bed and turned carefully out of the pots, preserving all the earth to their roots, and placed close together upon this new hot-bed, filling up the vacuities between the balls with loamy earth: the roots of the plants soon strike out into the fresh earth, which strengthens their flowers, and causes the fruit to set in plenty; proper care should then be taken to admit fresh air to the plants, and supply them properly with water, that they may produce ripe fruit in April.

By these means a succession of this fruit may be obtained from March, April, or even earlier; and in the open air from June to October and November, should the weather prove mild; for not only the Alpine but the White Wood Strawberry will continue bearing in tolerable abundance until the autumn frosts come on; especially in warm situations and soils not too light.

FRAME, GARDEN, a sort of box furnished with glass covers or lights at top to slide, used in gardens for protecting and forwarding tender and early plants of different kinds.

Frames of this sort are mostly formed of inch-or inch-and-quarter deal-board, made of different dimensions, the largest about three yards and a half long, and one and a half wide, as high again or more in the back as in front, to give the top a due slope to the sun, and proper declivity to carry off the wet, when covered with glass lights occasionally as they are wanted.

Common Kitchen-garden Frames may be of three different sizes, as, for one light, two lights, and three lights; the two last of which, however, are the most material, and employed for general uses: but it is necessary to have one or more one-light and two-light frames, especially in private gardens, the former as a seed-frame for a small hot-bed, particularly the seeds of cucumbers and melons for the early crops, and other tender plants; and the latter as a nursery-frame to the young plants of the same kinds, &c., to forward them to a due size for the three-light frames.

The one-light frame may be about four feet and a half width from back to front, and three feet six the other way; fifteen or eighteen inches high in the back, and from nine to twelve inches high in front, with a glass sash or light, made to fit the top completely, so as to slide up and down and remove when necessary. And the two-light frame may be seven feet long, four

and a half wide, and fifteen or eighteen inches high in the back, and from nine to twelve in front, having one cross bar, three inches width, ranging from the middle of the back at top to that of the front, serving both to strengthen the frame and help to support the lights; the two lights to be each three feet six wide, made to fit the top of the frame exactly. But a three-light forcing-frame should be ten feet six inches long, four and a half wide, and from eighteen inches to two feet high in the back, and from nine to twelve and fifteen inches in front; those designed principally for the culture of melons being rather deeper than for cucumbers, as they generally require a greater depth of mould or earth on the beds; though frames eighteen or twenty inches in the back, and from nine to twelve in front, are often made to serve occasionally, both for cucumbers and melons; each frame should have two cross bars ranging from the top of the back to that of the front, at three feet six inches distance, to strengthen them and support the lights: the lights should be each three feet six inches wide; the whole together being made to fit the top of the frame exactly every way.

They are sometimes made of larger dimensions than the above, but they are very inconvenient to move to different parts where they may be wanted, and require more heat to warm the internal air: in respect to depth, if they are but just deep enough to contain a due depth of mould and for the plants to have moderate room to grow, they will be better than if deeper, as the plants will be always near the glasses, which is an essential consideration in early work, and the internal air be more effectually supported in a due state of warmth; as the deeper the frame, the less the heat of the internal air in proportion; and the plants, being further from the glasses, will be disadvantaged in their early growth; for which reason London kitchen-gardeners have often many of their forcing-frames not more than fourteen or fifteen inches high behind, and eight or nine in front, especially those which are intended to winter the more tender young plants, such as cauliflowers, lettuces, &c.; and those for raising early small salad herbs, radishes, and many others.

But when for the protection of taller plants, they should be deeper in proportion. If designed as a nursery-frame for young pine-apple plants, three feet six, by fifteen or eighteen inches, is the proper depth; arranging the largest plants behind, the young yearling ones more forward, and the crowns and suckers of the year in the front of all: a frame of these dimensions may serve also for any of the hardier

kinds of low green-house plants, as myrtles, &c., where there is not a proper green-house, or as an easement to it when too much crowded. It is useful also as an occasional winter shelter to many sorts of curious young plants, ever-greens and others of the full ground, which, being tenderish in their younger growth, require protection for two, three, or more years, till they increase in strength, and are gradually hardened to the full air.

Deep sorts of frames are sometimes made use of in the culture of particular sorts of plants, to bring them up to a proper height. See **DRAWING FRAME**.

In all these sorts of frames, the wood-work of the backs, ends, and fronts should be of such thick deal as has been mentioned, which must be all neatly planed even and smooth on both sides; and the joints, in framing them together, be so close that no wet or air can enter; the cross bars or bearers at the tops, for the support of the glasses, should be about three inches broad and one thick, and neatly dove-tailed in at the back and front even with both edges, that the lights may shut down close, each having a groove or channel along the middle to conduct off all wet falling between the lights: at the end of each frame, at top, should be a thin slip of board four inches broad, arranged from back to front, joining close up to the outside of the lights, which is necessary to guard against cutting winds rushing in at that part immediately upon the plants, when the lights are occasionally tilted behind for the necessary admission of fresh air, or other purposes. In regard to the lights, the wood-work of the frame of each should be inch-and-half thick, and two-and-half broad; and the bars for the immediate support of the glass-work about an inch broad, and not more than inch-and-half thick; as, when too broad and thick, they greatly intercept the rays of the sun. They should only be just sufficient to support the glass-work without bending, and be ranged from the back part to the front.

The glass-work may either be laid in lead and well trimmed with cement, air and water tight, or in the bars of wood in putty, lapping at the ends: the latter method is by some preferred, as being more effectual for the discharge of wet, the lapping of the panes being left open or unputtied at bottom, that the rank vapour naturally arising in hot-beds, and all condensed drops against the glasses, may be discharged at these places, as well as admit a perpetual moderate current of fresh air, which may be beneficial to the plants: this mode, however, of leaving the lappings open, is by some objected

to, especially for very early work, on account of the too free admission of air in cold weather.

All the wood-work, both of the frames and lights, should be painted in oil, to preserve them from decay; a lead colour will be the most eligible, and if done three times over, outside and in, will preserve the wood exceedingly from the injuries of weather, and from the moisture of the earth and dung.

Frames for these purposes are sometimes made in a sort of hollow brick-work, so as to admit the heat from without. See plate on **FORCING FRAMES**.

FRAME-WORK, that sort of forcing or raising vegetable productions that is effected by means of frames and artificial heat.

FRAMING, the art of raising different sorts of tender plants and vegetable productions to perfection at an early period, by the use of frames and hot-beds, or by heat applied in some other way.

FRAXINUS, a genus containing plants of the hardy deciduous tree kind.

It belongs to the class and order *Polygamia Dioecia*, and ranks in the natural order of *Se-piariæ*.

The characters are: that in the hermaphrodite there is no calyx: or a one-leaved, four-parted perianthium, upright, sharp, small: there is no corolla: or four linear petals, long, sharp, upright: the stamina consist of two upright filaments, much shorter than the corolla: anthers upright, oblong, four-furrowed: the pistillum is an ovate, compressed germ: style cylindric, upright: stigma thickish, bifid: there is no pericarpium, except the crust of the seed: capsule two-celled, leafy, and flattened at top: the seed lanceolate, flattened, and membranaceous, one-celled: female the same, except that it has no stamina.

The species are: 1. *F. excelsior*, Common Ash-tree; 2. *F. rotundifolia*, Manna Ash-tree; 3. *F. ornus*, Flowering Ash-tree; 4. *F. Americana*, American Ash-tree.

In the first the leaves have generally five pairs of leaflets (four to six), and one odd one, of a dark green colour. The flowers are produced in loose spikes from the side of the branches, and are succeeded by flat seeds, which ripen in autumn. The lateral buds produce the flowers, and the terminating one the leaves.

It is observed by Martyn, that, as "there are not only hermaphrodite and female flowers, but also male ones, this species should seem referable to the order *Trioecia*, and that care should be taken in observing the flowers; as in those which are hermaphrodite the germ which lies between the two stamens does not grow up till

some days after they appear, so that at first they appear to be male flowers." It flowers in April, or the following month.

There are varieties with simple leaves, lobed, and even ternate; with pendulous branches—or Weeping Ash; with variegated leaves, yellow and white; or gold-striped and silver-striped.

In the second species the shoots are much shorter, and the joints closer together than in those of the Common Ash: the leaflets are shorter, with deeper serratures on their edges, and of a lighter green: the flowers come out from the side of the branches, are of a purple colour, and appear in the spring before the leaves come out. It is of humble growth, seldom rising to more than fifteen or sixteen feet in height in this climate.

The third species, according to Miller, is a low tree, about the same height as the preceding: the leaves are composed of three or four pairs of sawed lobes, far asunder, terminated by an odd one, much smaller and narrower than those of the Common Ash, but serrate, and of the same dark colour: the flowers in large loose bunches at the ends of the branches, having petals: they are of a white herbaceous colour, mostly males, and appear in May.

There is a variety, the Dwarf Flowering Ash.

In the fourth species, the New England sort, according to Miller, "the leaves have but three, or at most four pairs of leaflets, placed far distant from each other, and the odd leaflet running out into a very long point, of a light green, and no serratures on their edges. It shoots into strong irregular branches, but does not grow to a large size in the trunk. And in the Carolina kind the leaves have seldom more than three pairs of leaflets, the lower being the least, and the upper the largest; these are about five inches long and two broad, of a light green colour, and slightly serrate; the midrib is taper, and has short downy hairs on it: the seeds broader than those of the Common Ash, and of a very light colour.

The first of these is called the White American Ash; and the second the Red American Ash. And there is a third variety named the Black Ash, in which the stem is erect, branching, twenty or thirty feet in height, with large very dark leaves composed of three or four pairs of lobes and an odd one, small flowers of a greenish colour, and broad blackish fruit. Other varieties may also be found in the nurseries.

Culture.—These plants may all of them be increased with facility by seeds, which in the common sort should be sown in the autumn, and in the others as soon as they can be obtained in the spring, on beds of light mould over

the surface, raking them in to the depth of nearly an inch. The young plants should be afterwards kept clear from weeds, and when they have had one or two years growth they should be removed into nursery-rows, and placed two feet asunder, and one distant in the rows, where they must remain till fit for being planted where they are to grow.

The three last sorts may likewise be raised by budding or ingrafting upon common Ash stocks, when of the size of a good bean stem. This business should be performed about the latter end of summer; but the plants raised in this mode are not so fine as those from seed, on account of the stocks growing with more rapidity than the heads.

These are the only methods by which the variegated varieties can be increased.

All the sorts may be introduced as ornamental trees; but those of the American kind are the most proper in small plantations or shrubberies.

The first sort is highly useful as a timber tree.

FRIAR'S COWL. See ARUM.

FRINGE-TREE. See CHIONANTHUS.

FRITILLARIA, a genus comprising plants of the bulbous-rooted perennial flowery kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla is six-petalled, bell-shaped, spreading at the base: petals oblong, parallel: nectary an excavation or pit in the base of each petal: the stamens have six subulate filaments, approximating to the style, the length of the corolla: anthers quadrangular, oblong, erect: the pistilum is an oblong germ, three-cornered, obtuse: style simple, longer than the stamens: stigma triple, spreading, blunt: (style trifid, with three stigmas:) the pericarpium is an oblong capsule, obtuse, three-lobed, three-celled, three-valved (superior): the seeds very many, flat, semi-orbicular on the outside, in a double row.

The species are: 1. *F. Meleagris*, Common Fritillary, or Chequered Lily; 2. *F. pyrenaica*, Black Fritillary; 3. *F. imperialis*, Imperial Fritillary, or Crown Imperial; 4. *F. Persica*, Persian Fritillary, or Persian Lily.

In the first the root is a solid bulb or tuber, about the size of a hazel-nut, white or yellowish white, roundish, compressed, divisible into several, inclosed by the withered wrinkled bulb of the preceding year as in a case. The stem from six to twelve, fifteen, and even eighteen inches in height, advancing considerably in length after flowering; it comes out from the side of the root, is simple, upright, round, smooth, glaucous, and not unfrequently pur-

plash: the leaves three or four, sometimes five or six, grass-like, distantly alternate, half embracing, round on the under, and hollow on the upper side, somewhat twisted and glaucous: the flower usually single, sometimes two, or even three, on the top of the stem, large, pendulous, at first somewhat pyramidal, but afterwards bell-shaped, chequered with purple and white, or purple and greenish yellow. It is a native of the southern countries of Europe, flowering in April and May.

There are numerous varieties; the chief are, the Common Purple, the Blood Red, the Great Purple or Red, the White, the Double Blush, the Pure Yellow, the Chequered Yellow, the Great Yellow Italian, the Small Italian, the Small Portugal Yellow, the Black, and the Spanish Black.

The second species has a double fleshy bulbous root: the leaves are broader, and of a deeper green than in the first; the lower leaves are opposite, but those above alternate: the stem a foot and half high, terminated by two flowers of an obscure yellow colour, and spreading more at the brim than those of the first sort, but turned downwards in the same manner. It flowers three weeks after it; and is a native of France.

The third has a large round scaly root of a yellow colour, and a strong foxy odour: the stalk rises to the height of four feet or upwards; it is strong, succulent, and garnished two-thirds of the length on every side with long narrow leaves ending in points, which are smooth and entire: the upper part of the stalk is naked, a foot in length: the flowers come out all round the stalk upon short foot-stalks, which turn downward, each sustaining one large flower. Above these rises a spreading tuft of green leaves, which are erect, and called the Coma. It flowers the beginning of April, and the seeds ripen in July.

The chief varieties are; those with yellow flowers, with large flowers; and with double flowers; but that which has two or three whorls of flowers above each other makes the finest appearance, though it seldom produces its flowers after this manner the first year after removing.

The fourth species has a large round root: the stem three feet high, the lower part closely garnished on every side with leaves, which are three inches long and half an inch broad, of a gray colour, and twisted obliquely: the flowers are in a loose spike at the top, forming a pyramid; shorter than the other sorts, spreading wider at the brim, and not bent down; of a dark purple colour; appearing in May. They seldom produce seeds in this climate.

There is a variety which has a much shorter stem and smaller leaves; the stem branches out at the top into several small peduncles, each sustaining one dark-coloured flower. It is termed Dwarf Persian Lily.

Culture.—The common mode of propagation in all these plants is by off-sets from the sides of their roots, separated every second or third year: the proper time for which is when their flower-stalks decay, taking the whole root up entirely, and separating them into distinct roots, then planting the smaller off-sets by themselves in nursery-beds, to remain a year or two, to acquire a flowering state; and the larger roots, where they are to remain for flowering.

They are likewise capable of being propagated by seed; but this is principally practised for new varieties; and the process is tedious; the Fritillary and Persian Lily being three years, and the Crown Imperial sometimes six or seven, before they flower in perfection. The seeds may be sown in the beginning of autumn, in large wide pots, or in boxes of similar width, filled with light mellow earth, each sort separate, covering them evenly with fine earth half an inch deep, placing the pots, &c. to have only the morning sun all summer, or during hot dry weather, and in the full sun in winter and spring: the plants will appear in the spring, which, after the first or second year's growth, when the leaves decay in summer, may be taken up, and the whole planted immediately in nursery-beds, in shallow drills four inches asunder, to remain till they flower.

They are all hardy, and highly ornamental plants for the borders, clumps, and other parts; the fourth sort being set backwards, the third in the middle, and the others forwards.

FRUIT, the produce of various sorts of trees used as food, either in a raw or prepared state.

All sorts of fruit should be gathered from the trees or plants when perfectly dry, and never when in a dewy or wet condition. In many of the finer and more delicate fruits, it is of advantage not to permit them to remain on the trees till they are over ripened. In gathering them, the bloom should always be preserved upon them as much as possible. In the almond or peach, plum, and finer cherry kinds, it is usual to deposit them as soon as gathered, in shallow sieves or baskets, spread over with leaves.

In the gathering of apples and pears—as those which are shaken or beaten from the trees never keep well—Mr. Forsyth advises, that they should be all hand-picked, by means of a stage or steps contrived for the purpose, and other apparatus necessary for receiving and conveying

them away, some dried short cut grass being employed to prevent their being bruised on being deposited in them.

It is likewise observed, that great attention should be paid to their ripening, never gathering them at any particular period or season, as is often the case, on account of their becoming ripe at different times according to circumstances, but to be regulated by the sound fruit, when the trees are healthy, coming off into the hand without any force on being taken hold of: it should be picked off the trees and laid in the baskets and other places in a careful manner, so as to prevent bruising. When it is suffered to remain till it begins to fall itself, some well dried short grass mowings, pease-haun, barley-straw, or other similar dry material is recommended to be spread over the surface of the ground, to prevent the fruit being bruised by falling. But the fruit collected in this way should constantly be laid up separately, and made use of before that which was gathered by the hand; all such as are bruised being laid aside for immediate use.

After all the fruit has been gathered, the hay or straw should be raked up and removed.

When the fruit is wholly collected, it must be deposited in the store- or fruit-room, some of the dried short grass being previously spread over the middle part of the floor. It should be carefully laid in heaps from the baskets upon the dried grass, each sort separate; the heaps being from two to three feet in height, according to the quantity of fruit. When the heaps have been formed, they should be covered with the same material as was laid on the floor, to the thickness of two inches or more, in order that they may sweat. When they have remained in this state a fortnight, they should be opened and turned over, wiping each with a woollen cloth often dried, carefully removing those that were at the tops to the middle. After having continued eight or ten days more covered as before, the watery material will be sufficiently expended, when the fruit must be again looked over and wiped as in the former case, rejecting all such as are in the least degree injured.

While the process of sweating is going on, the windows of the room should be kept open, when the weather is not moist, to promote the exhalation of moisture. When the sweating is very considerable, it will be necessary to turn and wipe the fruit during the process.

Wheat straw has been commonly made use of in laying up this sort of fruit; but Mr. Forsyth has found, that when any of the fruit begins to decay, if it be not quickly removed, the straw imbibes the moisture issuing from it, and communicates an unpleasant taste to such as is sound.

When fruit is stored up on shelves in the rooms, they are advised to have the bottoms covered with thin coarse canvass, at about eight-pence or ten-pence the yard, being placed upon it in single layers, after being wiped quite dry, care being taken not to lay them upon each other. They should then be covered with a piece of the same canvass, old news, or whited brown paper, to exclude the action of the air, guard against frost, and preserve the smoothness on the skin of the fruit. It should be turned two or three times in the course of the winter, to guard against rotting on the under side, all the damaged fruit being carefully removed each time.

In storing it in this manner, the earliest sorts should be placed on the lower shelves or drawers according as they come in, in this order; the nonsuch, golden rennet, and jenneting apples, and the burgainot and burre pears, as the jargonelle is found to keep best on the tree, rotting almost immediately on being gathered. In this way a proper succession of fruit may be provided.

As it requires much time in storing in this way where there is much fruit, it may be done in wet weather, and the evenings, when the men can be better spared than in the day-time.

Where there are not proper fruit-rooms, this sort of fruit may be kept in store-houses in baskets or hampers, placing soft paper in the bottoms and round the edges to prevent bruising them, laying a layer of fruit and a layer of paper alternately, covering the top with paper three or four times folded, to guard against the air and frost.

The different sorts of fruit should be packed separately, and have labels fastened to them, so as to know their names, and the times of their being in a proper state for use.

The best way of keeping fruit is, however, Mr. Forsyth thinks, by packing it up in glazed earthen pans or jars. In doing which, the fruit should be first separately wrapped in soft paper, then a little well-dried bran applied over the bottoms of the jars, above which a layer of fruit should be placed, continuing them alternately, till the jars are quite full, when they should be shaken, and a little more bran added, covering the whole over with bladders to exclude the air, putting on the covers, which should fit in a close manner. The rooms in which these are placed should be capable of admitting a fire in moist weather.

In packing fruit for carrying, Mr. Forsyth thinks strong deal boxes of different sizes the most convenient and useful. Those which he employs are two feet long, having the breadth and depth of fourteen inches; and one foot nine

inches long, with one foot in breadth and depth. They are constructed of inch-deal, well secured by cramps at the corners, having a small iron handle at each end to secure them by. In these, melons, currants, cherries, pears, peaches, nectarines, plums, grapes, and other similar sorts may be carried, the heaviest fruit of each sort being put at the bottom, the first sort wrapped up in soft paper, and all the others, except the currants and cherries, first in vine-leaves and then soft paper. The other two are conveyed in flat tin boxes, about fourteen inches in length, ten in breadth, and four in depth.

In packing them, for the melons, a layer of fine moss and short soft dry grass well blended together is placed at the bottom of the deal box, then the melons packed in with it in a tight manner in every direction, choosing them as much of the same size as possible. When the melons are put in, a thin layer of moss and grass is placed over them, upon which the tin box having the currants and cherries packed in it by intervening layers of fine dry moss, so as to be quite full, is packed firmly in with grass and moss all round to prevent its moving; over which another thin layer of moss is spread, and the pears packed in closely in the same manner as the melons, proceeding in the same way with the other fruits, so as to close with the grapes, filling up with moss, so as that the lid of the box may shut down quite tight, and prevent rubbing. Each box should be provided also with a lock, and two keys to serve the whole, one for the packer, and another for the emptier. When the boxes are locked down, they should be well corded.

In this manner his majesty's fruit is sent to different places, and may be conveyed to any part of the kingdom. When it is only sent a short distance, the moss and boxes should be returned, and be kept well aired.

FRUIT-GARDEN, that sort of garden which is principally planted with trees for the purpose of affording fruit of different kinds. The situation of this sort of garden should be warm sheltered, and open to the south or south-west, in order that it may enjoy the full benefit of the sun, and of course ripen the fruit in the best and most perfect manner. See **GARDEN** and **ORCHARD**.

FRUIT-ROOM, an erection constructed for the purpose of storing up different sorts of fruit. They are formed of different dimensions according to circumstances, being lined with thin boards, and fitted up with shelves, bins, boxes, drawers, and other conveniences for the reception of fruit; all of which, as well as the floors, should be of white deal, as Mr. Forsyth

remarks, that when red deal is made use of for these purposes, it is liable to give a disagreeable resinous taste to the fruit and spoil its flavour: on this account, under other circumstances, he advises covering the shelves with canvass, &c. as mentioned in the preceding article.

FRUIT-TREE, is that which produces eatable fruit, either for the table or culinary uses.

There are many fruit-trees, fruit-bearing shrubs and shrubby plants that ripen their fruit perfectly in this climate, with their several species, and numerous varieties: the principal sorts of which are those of the almond kind, as the almond, peach, and nectarine trees; the plum sort, containing different kinds of plum, apricot, and cherry trees, the pear kind, comprehending various sorts of pear, apple, and quince-trees; the vine, containing many sorts of grape-trees; the fig, comprehending many sorts of fig-trees; the several sorts of medlar-trees; the different kinds of mulberry-trees; the chestnut and walnut-trees; the common nut kind, containing many sorts of filberts and other nut-trees; the currant-, gooseberry-, and raspberry-trees, with many others; the nature and management of each of which will be fully explained under their respective genera.

FUCHSIA, a genus comprehending plants of the flowery exotic kind, for the stove.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Onagraceæ*.

The characters are: that the calyx is a one-leaved perianthium, funnel-form, coloured, superior, deciduous: tube ovate at the base, contracted above it, then gradually widening, patulous, angular: border short, four-parted; parts ovate, acuminate, spreading: the corolla has four petals, ovate, acuminate, sessile, spreading, the same length with the parts of the calyx: the stamina have four filaments (or eight) filiform, erect, inserted into the tube of the calyx below the middle, and a little longer than the tube: anthers twin: the pistillum is an inferior germ, ovate, below the insertion of the calyx constricted: style simple, the length of the stamens: stigma obtuse (club-shaped): the pericarpium is an ovate berry, four-grooved, four-celled: the seeds many, ovate, fixed in a double row to a columnar receptacle in the middle of the berry.

The species cultivated are: 1. *F. triphylla*, Three-leaved Fuchsia; 2. *F. coccinea*, Scarlet-flowered Fuchsia.

The first has a woody, branched, reddish root: the stem is herbaceous, upright, quite simple, reddish green, leafy, two feet high at most: the

leaves are lanceolate, entire, pale green, a little firm or coriaceous, sessile, disposed in threes: peduncles one-flowered, scattered, and forming a straight terminating raceme: the flowers large, very fine, of a very bright scarlet, having eight stamens, not projecting beyond the flower; and the berry is a little larger than an olive, fleshy, soft, reddish black, somewhat pubescent, of a very pleasant taste: the seeds small and brown. It is a native of St. Domingo.

The second species is a shrub, growing to the height of six or seven feet: the leaves are commonly opposite, on short petioles, of a fine green, having the veins tinged with red, with a fine down on them: the peduncles axillary, one-flowered, longer than the leaves: the flowers are pendulous, and of a bright scarlet colour. It is a plant of peculiar beauty, producing its rich pendent blossoms through most part of the summer: the petals in the centre of the flower are particularly deserving of notice, as they somewhat resemble a small roll of the richest purple-coloured ribband. It is a native of Chili.

Culture.—These plants are capable of being increased by seeds, layers, cuttings, and sometimes even by suckers. The seeds should be sown in pots of good light mould, plunging them into a bark hot-bed. When the plants appear, they should be kept clean, and be often refreshed with a little water. After they have attained a few inches growth, they should be shaken out of the former pots, and after being carefully separated and planted in separate small pots with the same sort of mould, be replunged in the hot-bed, and well shaded till they become fresh rooted, when air should be admitted pretty freely. They must be kept warm during the winter season.

The layers, cuttings, or suckers may be laid down or planted out in the latter end of summer or beginning of autumn.

They must all be kept in the stove during the winter season, but in the summer may be set out in the green-house.

They afford much ornament by their beautiful scarlet flowers.

FUMARIA, a genus containing plants of the tuberous-rooted low flowery perennial kind.

It belongs to the class and order *Diadelphia Hexandria*, and ranks in the natural order of *Corydalis*.

The characters are: that the calyx is a two-leaved perianthium: leaflets opposite, equal, lateral, erect, acute, small, deciduous: the corolla oblong, tubular, ringent, palate prominent, closing the throat: upper lip flat, obtuse, emarginate, reflex: the nectary the base of the upper lip prominent backward, obtuse: the lower lip en-

tirely similar to the upper, keeled towards the base: nectary the keeled base, but in this less prominent: the throat four-cornered, obtuse, perpendicularly bifid: the stamina consist of two equal filaments, broad, one within each lip, inclosed, acuminate: anthers three at the end of each filament: the pistillum is an oblong, compressed germ, acuminate: style short: stigma orbiculate, erect, compressed: the pericarpium is a one-celled silicle: the seeds are roundish.

The species are: 1. *F. cucullaria*, Naked-stalked Fumitory; 2. *F. sempervirens*, Glaucous Fumitory; 3. *F. lutea*, Yellow Fumitory; 4. *F. capnoides*, White-flowered Fumitory.

The first has a scaly root, the size of a large hazel-nut: the flower-stalk is eight or nine inches high: the root-leaves are in pairs, triternate, gashed, smooth, slender; with red petioles: the scape simple, round, length of the leaf, rufous: the raceme terminating, simple; the flowers (four or five) pendulous; of a dull white colour. It is a native of Virginia. Perennial, flowering in June and July.

The second species is annual: the stem upright, a foot and half high, round, and very smooth, sending out several branches at top: the leaves smooth, branching, pale, divided like the common sort, but the leaflets larger and more obtuse: the flowers in loose panicles from the sides of the stem and at the extremities of the branches, of a pale purple colour, with yellow chaps or lips: the pods are taper, narrow, an inch and half long, containing many small black shining seeds. It flowers during summer, and is a native of North America.

In the third, the root strikes deep into the ground: the stems are many, succulent, diffused, about six inches high: the leaves on long branching petioles, composed of many irregular leaflets, trifid at the top: peduncles axillary, naked, longer than the leaves, supporting eight or nine flowers, of a bright yellow colour, in a loose spike: the leaves continue green all the year, and the flowers in succession from April to October. It is very like the fourth species, but is perennial; and according to Miller, the stalks have blunt angles, are of a purplish colour; and the flowers grow in a looser panicle, on longer pedicles. It is a native of Barbary.

The fourth is annual: the stem four-cornered at the base: the leaves superdecompound, the terminating leaflets larger, and semitri-fid; the middle segment lobed; petioles three-cornered: the racemes naked; pedicles shorter by half than the corollas, blackish at the tip. There is a succession of the flowers from May

F U M

to October. It is a native of the South of Europe.

Culture.—The first sort of these plants may be readily increased, by planting off-sets from the roots in a light soil, in a shady situation, in the beginning of autumn, as soon as the stems begin to decay.

The other sorts may be raised by sowing the

F U M

seeds where the plants are to grow, as soon as they become perfectly ripened.

The only culture they demand afterwards is, that of keeping them free from weeds.

They are all very ornamental in the fore parts of clumps, borders, and other parts of pleasure-grounds.

FUMITORY. See **FUMARIA**.

G A L

GALANTHUS, a genus containing a plant of the bulbous-rooted flowery perennial kind. It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceae*.

The characters are: that the calyx is an oblong spathe, obtuse, compressed, gaping on the flat side, withering: the corolla has three petals, oblong, obtuse, concave, lax, patulous, equal: nectary cylindric, three-leaved, half the length of the petals; leaflets petal-shaped, parallel, emarginate, obtuse: the stamens consist of capillary filaments, very short: anthers oblong, acuminate, ending in a bristle, convergent: the pistillum is a globular, inferior germ: style filiform, longer than the stamens: stigma simple: the pericarpium is an oval-globular capsule, obtusely three-sided, three-celled, three-valved: the seeds several and globular.

The species is *G. nivalis*, Snow-Drop.

It has the bulb coated and truncate: the leaves are yellowish at the base, callous at the tips: the scape half a foot or a span in height, ancipital, striated, involved at the base in a pair of leaves: the sheath whitish, truncate, involving the leaves and scape: the peduncle usually comes out from the left cell of the spathe, is weak, and wrinkled below the germ: the flowers are solitary, and of a milk-white colour. It is a native of Switzerland, flowering in January and February.

It varies with semi-double, and with double flowers.

Culture.—These little elegant plants are increased by planting off-sets from their roots in the places where they are to remain in the latter end of summer, when their leaves begin to decline, or in the beginning of the autumn. The roots should not, however, be removed oftener than every third year.

G A R

They should always be planted in bunches of a great number of bulbs together, in order to make a better show, as when set out singly they have no effect.

They are well adapted to the fronts of borders and clumps, as well as woody and shady plantations, producing a fine effect when in blow.

The single sorts come first into blow.

GARDEN, a portion of ground laid out for the purpose of raising and providing different sorts of plants of both the flowery and esculent kinds, as well as various other vegetable productions and fruits.

It is usually distinguished, from the nature of the produce, into the Flower- and Kitchen-garden; the latter being chiefly destined to the raising of useful culinary roots, plants, and vegetables.

Where the first sort of gardens are necessary, they should be laid out so as to have open sunny sheltered exposures, forming if possible the connections between the ornamented or pleasure-grounds, and the kitchen-gardens, according to the general nature and situation of such grounds, so as to afford the most striking effect and variety.

Their forms may vary in proportion to the distribution of the lands and the particular circumstances of their situations, being made square, circular, oblong, or in any other manner, according to the taste of the proprietor; the parts approaching the ornamented grounds being mostly separated by walks, and the introduction of different sorts of the most curious hardy flowering shrubby plants. The interior parts should have a neat ornamental distribution, so as to produce the most striking variety when the flowers are in blow, and afford the greatest convenience in their cultivation. It was formerly the practice to have them laid out with walks surrounding the outer

boundaries or borders being introduced all round within them, and the inner compartments divided into a variety of narrow straight borders or plain four-feet wide parallel beds, having two-feet wide alleys between; the whole of them being laid in a rounding form, and neatly edged with dwarf box, or some other plant suited to the purpose; and the walks and alleys laid with the finest sand; but at present they are mostly arranged so as to suit the nature of the situation, produce the most ornamental effect, and afford the greatest ease, convenience, and success in the culture of the flowers.

They should contain all the different sorts of hardy curious ornamental flower plants, whether of the bulbous, tuberous, or fibrous rooted kinds.

The second division, or kitchen-garden, must be laid out in different methods, according to the differences in the circumstances of the ground. It is sometimes so managed as to constitute a part of, or communicate with, the pleasure-ground; but where there is sufficient extent of land, it is better to be distinct, or detached from it, and in every case as much concealed from the house as possible. The most convenient distribution is at some distance behind it; but on the sides may answer very well, especially when not too contiguous, or so situated as to interrupt any particular prospect.

In regard to the nature of the situation most proper for the purpose, it should, when convenient, be where there is a gentle declination towards the south or south-east, in order that it may have the full advantage of the morning sun. Mr. Forsyth remarks in his "Treatise on the Culture and Management of Fruit-trees," that "if it be situated in a bottom, the wind will have the less effect upon it; but then the damps and fogs will be very prejudicial to the fruit and other crops;" and that when "situated too high, although it will in a great measure be free from damps and fogs, it will be exposed to the fury of the winds, to the great hurt of the trees, by breaking their branches, and blowing down their blossoms and fruit." It should therefore, in his opinion, "be well sheltered from the north and east to prevent the blighting winds from affecting the trees, and also from the westerly winds, which are very hurtful in the spring or summer months." Where it is not "naturally sheltered with gentle rising hills, which are the best shelter of any, plantations of forest-trees should," he says, "be made at proper distances, so as not to shade it." These, he supposes, will be found the best substitute, but at the same time the sun and air should be freely admitted. On this account it is supposed that "a place sur-

rounded by woods is a very improper situation for a garden or orchard, as a foul stagnant air is very unfavourable to vegetation." It is likewise added that "blights are much more frequent in such situations than in those that are more open and exposed." In these sheltering plantations, Mr. Forsyth advises that fruit-trees should be intermixed with those of the forest kind, which, besides being advantageous in the way of affording shelter, ornament, and fruit, become nurseries for raising forest-trees.

But where the situations will not admit of this, he suggests the propriety of planting some cross rows of fruit-trees in the garden at the distances of about forty or seventy yards from each other, more or less, in proportion to the extent: where the length is considerable, one row may be sufficient on each side, but in short cross rows two on each side the walks or paths. In this intention the trees should not be planted opposite one another, but in such a manner as that those in one row may be opposite to the middle parts of the open spaces in the others. In this method, besides the ornamental effect that is produced, the force of violent winds is broken, and much damage to other trees prevented.

In this view, the best sort of trees, according to Mr. Forsyth, is that of dwarfs, with stems about two feet high, which may readily be provided by removing the lower branches.

In fixing upon ground for a garden, it is likewise a point of much importance to have the natural soil of a good quality, being sufficiently dry, mellow, and capable of being easily wrought in all seasons, as well as of a good depth, as from a foot and half to three feet. And if the surface be uneven, it will be the better, as there will be a greater variety in the quality, and of course it will be more fully adapted to the culture of different crops. The most proper sort of soil for this purpose is that of the rich friable loamy kind, and the worst those of the very light, sandy, and stiff clayey descriptions. But the properties of soils may be much improved in most cases by a judicious application of different sorts of materials in the way of manure. See SORT and MANURE.

Where fruit-trees, especially those of the finer, as well as apple and pear kinds, are to be planted, a greater depth of good soil, as well as a greater degree of dryness, is necessary.

There are very different opinions in respect to the most proper and advantageous forms for this sort of culture; but though much must constantly depend on the nature of the situation, where the spade is to be made use of in performing the work, the square shape, or that which

approaches nearest to it, is probably the most convenient. In other cases, especially where the principal part of the work is, from the difficulty of procuring labourers, and the increasing expense of them, to be executed by the plough, the oblong and circular forms may be the most suitable, as they may be wrought with greater facility and convenience.

The size of kitchen-gardens should always be fully sufficient for the extent of the family, varying from half an acre, to four, five, or more, within the fence. The first quantity, where there are wall and espalier trees, will furnish sufficient employment for one man, and afford due supplies of vegetables and fruit for families consisting of a dozen or more persons. But much in these respects depends upon proper care and management.

The best mode of inclosing garden-ground is by means of brick walls, where that sort of material can be easily procured, and expense is not an object. But oak paling fences answer the purpose very well. These fences, whether made of brick or wood, should be eight, ten, or twelve feet in height. When the extent of walling is sufficient, Mr. Forsyth thinks ten feet walls better than such as are higher, as being more convenient for various purposes. He also advises that they should have borders or slips on the outsides of them, of from forty to sixty feet or more in breadth, where the ground can be spared, which should likewise be inclosed by an oak paling, six or eight feet in height, having a chevaux de frise at the top to strengthen the fence and render the garden more secure. The latter may be conveniently formed, he says, by planing a piece of wood four inches in breadth, and an inch and quarter in thickness, into the shape of the roof of a low pitched house on the upper side, then drawing a line on each side from end to end, at the distance of about an inch and quarter from the upper edge, driving twelve-penny nails through them in regular rows, at the distance of four inches from each other, so as to come out near the upper edge of the contrary side; each being opposite the middle of the space between two nails on the other side. The nail heads should be sunk, and strips of wood nailed over them, tenter-hooks being driven in between the nail points, and the whole nailed fast to the outside top of the fence; continuing pieces in this way till the whole is completed.

By means of these inclosed borders or slips on the outside of the garden walks, Mr. Forsyth thinks there will be plenty of ground for gooseberries, currants, and strawberries, and both sides of the walls may be planted with trees,

by which there will be a considerable increase of wall-fruit. And where there are parts of such slips lying near to the stables, sufficiently sheltered and exposed to the sun, they may be converted to the purpose of a forcing ground for raising melons, cucumbers, and other similar kinds of fruit.

The advantages of this are, that there will be no litter carried within the walls, to dirty the walks; the beds will be concealed from the sight, and much time and labour saved in carting and wheeling the dung.

Where there are not these sorts of slips, the forcing-grounds for melons, cucumbers, &c. should be made in situations that are warm, and open to the full influence of the sun, being well inclosed, and as contiguous to the stable as the nature of the situation will allow.

The great objection to having slips or borders on the outsides of the walls of gardens is that of the vast expense of erecting two fences, where one is capable of answering the purpose, and by proper attention in the distribution of the internal parts, with perhaps nearly equal advantage.

In the distribution of the quarters or parts of the garden, attention should be had to the nature, form, and extent of the ground, so as that they may be laid out in the best manner, in respect to the convenience of managing them, exposure, and size; but they should never be made too small, as there will be much loss of ground by the walks which are essentially necessary in their cultivation. With regard to their form, it may vary according to circumstances, or the taste of the proprietor; but the most convenient and economical one, in respect to ground, is the square, where the garden has been laid out in that manner.

It is usual to have borders round the whole of the inclosing fences, whether they be constructed of brick, stone, or timber; and when there are cross walls, they are likewise generally introduced on the sides of them. The breadths of these should be proportioned to the height of the walls or palings, and the extent of the garden, as from six, to eight, ten, and twenty feet, especially those which have a southern aspect, and are intended for the reception of fruit-trees, as their roots will have more room to extend themselves and procure due nourishment. Besides, wide borders are the most advantageous and economical in the culture of different vegetable crops.

When the gardens are large, other borders may be carried along on the sides of the walks, between them and the espalier or standard fruit-trees; but in other cases this is inconvenient, as taking up too much of the quarters. These

should not exceed six or eight feet in breadth.

In some cases it is the practice to have the edges of the border made firm and even, and planted with dwarf box, or some other plant made use of for the purpose; but as these sorts of edgings are very liable to be destroyed in different places by wheeling over them, and by that means become unsightly, it is probably a better method to only have the edges of the border made up firm and even, close to the gravel of the walks.

There should be a walk introduced on the sides of the borders all round, and likewise in the middle, where the ground is of considerable extent. Cross walks are also necessary where the garden has a great length. But as walks take up much ground, there should be as few as possible. Those on the sides of the borders need not have more breadth than from four to six feet; but the middle ones should be seven feet wide, in order that a cart may be admitted when necessary.

It is also necessary to have walks about two feet or two feet and a-half wide, and the same distance from the walls, where there are wall-trees, for the convenience of pruning, training, and nailing, as well as that of gathering the fruit, and admitting a barrow or garden-engine for watering them.

And besides these permanent walks, when the gardens are of much extent, trodden path-walks will be requisite in different parts, for the convenience of cultivation, and as divisions between the crops.

All the first sort of walks should be laid out in a regular manner, and be firmly made up with brick rubbish, stone-masons' chippings, or some other coarse material, and neatly gravelled over. For this last purpose binding-sand answers extremely well, also good clean sifted road drift, as they may be readily kept clean by the hoe and rake; but sea-coal ashes are preferred by some, as being still more dry and firm, more easily kept in order, and cleaner to walk upon in thaws, as well as useful, while new and rough, in preventing slugs from travelling over them from the different quarters.

The narrow walks on the back sides of the borders, near the fruit-trees, need not be laid with any sort of coarse rubbish, being merely covered over to the depth of a few inches with sand or sea-coal ashes; as by this means the ground may be occasionally dug up, and the paths relaid.

Whatever sort of material is made use of in forming the walks, it should be spread in a neat even manner, so as to leave them in a re-

gular moderate convex or rounded form, by which the water will be readily carried off to the sides, and the walks kept perfectly dry. After the surface material has been thus applied, and evenly raked over, it should be firmly rolled down by a heavy iron roller, and occasionally repeated after being well moistened with rain.

Sometimes walks are laid with turf or sward; but this is a very improper material, as being troublesome to keep in order, and soon rendered disagreeable to the sight by being wheeled and trampled upon.

In building the walls of kitchen-gardens, when the height is considerable, the foundation should be from two to two bricks and a half in thickness, and the offset not more than one brick above the height of the level of the border, being then brought to a brick and half in thickness: when they are extensive they should be strengthened and supported by piers at the distance of from forty to sixty feet, according to their height. The projection of these piers should not be more than about half a brick before the surface of the wall. Walls for fruit-trees should always, if possible, be built of brick, as stone is found not by any means so favourable to the maturation of the fruit, and far more inconvenient in the nailing of the trees. The manner of constructing hot-walls for bringing fruit forward by artificial heat will be described hereafter. See HOT-WALL.

Some advise projecting copings of stone or wood to be fixed upon the tops of the walls; and the author of the "Philosophy of Gardening" conceives that they may be of great utility in the early vernal months in preventing the tender young shoots of fruit-trees from being destroyed by frost, as, from their being less imbued with the night-dews in consequence of them, they will be less exposed to danger from that cause; it being well ascertained that the fine shoots of vegetables are most exposed to the destruction of frost when in a moist state.

Mr. Forsyth does not however approve of such fixed copings, especially when they project so far as is usually the case; moveable wooden ones fastened by iron hooks to pieces of wood built into the tops of the walls being in his opinion preferable. Besides, they are useful to fix nettings, &c. to in the early spring for protecting the trees with. When fixed copings are adopted, they should not, he thinks, extend above an inch on each side the wall, as the slight projection will be sufficient to preserve it, and at the same time not prevent the dews and rains from falling upon the upper parts of the trees, by which they are greatly benefited. Copings are sometimes formed of a sort of

brick, made convex on the side which is upwards; but these are expensive. A sort of slate, brought from Wales, has lately been made use of for this purpose, which seems to answer very well. It is made to have the projection just mentioned. This sort of coping has been employed in the extensive gardens at Ashsted Park, near Epsom; and may be had of different sizes at Mr. Samuel Wyatt's slate-wharf, near Blackfriar's Bridge. Mr. Forsyth suggests that common copings should have a little slope given them "towards the north or east, according to the aspect of the wall," by which the wet from the south and west sides may be taken away, and the danger of the early blossoms and fruit being injured on the south and west walls in cold nights be avoided.

When the soil of a garden is naturally of a stiff quality and retentive of moisture, proper under-draining will be essentially necessary in order to the production of good well-tasted fruit, as well as fine culinary vegetables. In these cases the main or leading drains should be made under the walks, and those from the quarters be formed to communicate with, and empty themselves into them. They should be constructed of bricks, either common or such as are formed for the purpose, and be laid in such directions as are the best adapted to the removal of the injurious wetness, and always of such depths as to prevent their being injured by the spade in working the ground. By this means the soil will be kept in a suitable state for the growth of the plants, and the walks preserved in a fine state of dryness, so as to be sufficiently firm for carting or wheeling upon, even in wet seasons.

When the ground destined for the purpose of forcing is on a level considerably lower than that of the garden, the water from the latter may be made to supply the former, by having the main leading drain terminating in a tank, pond or cistern constructed in it for the purpose, which in many situations may be extremely convenient and useful.

In many cases, and especially where the garden-grounds are of a dry quality, it is of vast advantage to have them situated contiguous to rivers, brooks, or large basons of water, from which they can be supplied by means of drains, pipes, or other contrivances, in the most hot and droughty seasons.

Where no supplies of water can be provided and brought to the garden in these ways, Mr. Forsyth suggests that where they lie on the sides of public or other roads, and the level of the grounds is suitable, hollow drains should be formed in the most convenient parts, to receive the water that washes them in rainy seasons,

and convey it to large ponds or other places made for its reception in the highest part of the garden-ground that will admit of it; from which it may be dispersed to the different quarters which will allow of it, by pipes, with cocks fixed at different places for turning it on as may be necessary. Or by having suitable channels cut, it may be turned upon different parts, as in the practice of watering meadow land, which, where the roads are repaired with calcareous materials, or there is much vegetable matter washed down them, may be highly beneficial in the way of manure. A proper ready exit for the superabundant water must always be provided in these cases, to prevent stagnation. And where the ground has been much enriched by stable manure, the practice should be cautiously adopted, as more may be conveyed away in the state of solution than is brought by the water. The most convenient time for turning on water is generally during the night, which in dry seasons is the most advantageous to the plants or crops.

The expense in pipes, drains, channels, and other apparatus for these purposes, will be considerable at first; but the saving in labour and time in the pumping and carrying water, it is conceived, will soon repay it. Where water is under the necessity of being pumped up from deep wells, large basons or reservoirs should be provided, in which it should remain some time exposed to the influence of the atmosphere before it is made use of in the above or any other way.

When garden-grounds are of a wet spewy quality, Mr. Forsyth recommends basons to be formed in the most convenient parts, for the reception of the water that proceeds from the drains, and which falls in rain on the walks and paths.

In new kitchen-garden grounds, where the soil is of a strong stiff heavy quality, they should be ploughed or trenched over three or four times, being exposed to the effects of frost, in pretty high ridges, for a winter, in order to bring them into a proper condition, before the crops are put in. A crop of potatoes or beans also assists greatly in bringing them into a proper state of pulverization for being planted upon with culinary vegetables.

When the land is become sufficiently broken down and reduced, the wall- and other trees, as well as different sorts of vegetable crops, may be put in. Some, however, put the fruit-trees in before this has been accomplished; but it is not a good practice, as they are liable to be injured by the digging which afterwards becomes necessary in preparing the soil.

In planting wall-trees they should be set at

different distances according to the kinds: those of the peach, nectarine, apricot, plum, and cherry descriptions, at fifteen, eighteen, or more feet, and for figs and pears twenty are seldom too much, suitable aspects being chosen according to the kinds. Between their wall-fruit trees, some at first introduce half or full standards, that the walls may at once be covered, removing them afterwards. But this is a method that should never be attempted when it can be avoided.

Trees of the espalier kind are likewise frequently introduced in ranges round the main quarters at the distance of about six feet from the side of the walk, and from fifteen to twenty in the rows, according to the sorts that are made use of. Within these ranges of espalier trees, good standards of tall growth are occasionally introduced at the distance of thirty, forty, or more feet in each direction. Where there are orchards, this should, however, always be avoided. See the **CULTURE OF THE DIFFERENT KINDS**.

Fruit-trees of the small shrubby kinds, such as gooseberries, currants, raspberries, &c., where there are not out-slips, are frequently introduced on the sides of the quarters, and as divisions to them when large, at the distance of eight or nine feet from each other. When planted in this way, they should be trained in the fan form. But it is better, where it can be done, to have them in separate plantations, especially the first sort. See the **CULTURE OF THE SEVERAL SORTS**.

In respect to the distribution of the vegetable crops, it must be regulated by the nature of the situation, their particular kinds, as well as the taste and experience of the gardener. On the narrow borders under the wall-trees, various sorts of small crops may be grown, both of the early and late kinds, according to the difference of the aspects; but all the deep rooting sorts should be avoided, such as cabbages, cauliflowers, beans, and peas, except those of the frame kind, as being injurious to the trees by the shade which they cause, as well as by depriving them of due nourishment.

But the large part of the borders next the walks is proper for raising all sorts of the more early crops, such as those of the radish, lettuce, spinach, carrots, French bean, salad herb, and all the dwarf pea kinds that are cultivated in wide rows; those which have a southern aspect for the earliest crops; and the eastern and western ones for succession crops of the several kinds; and the northern ones, as being more cool, for raising and pricking out many sorts of small plants, slips, and cuttings, in the

summer season, when the other parts are apt to be too dry.

Such borders as are next to the ranges of espalier trees, are well suited to the different low growing crops, such as lettuce, spinach, endive, strawberries, &c. and for pricking out upon, at different seasons, many sorts of plants to be afterwards transplanted into different situations.

The quarters or large divisions should always be destined for the reception of the large principal crops, such as those of the onion, leek, carrot, parsnip, turnip, beet, potatoe, cabbage, cauliflower, brocoli, colewort, kale, pea, bean, scarlet-bean, clery, artichoke, asparagus, and other similar kinds.

The preparation of the ground, the methods of manuring, and putting in the crops, with their modes of after-culture and management, are fully explained under their respective genera.

In every department the greatest attention should be paid to the keeping of the different parts fully cropped, as well as to neatness and regular order; and as the crops are removed from the ground in the autumn, it is often of great advantage to have it ridged up for the winter.

When the garden has been thus laid out, planted, and finished, Mr. Forsyth has found much advantage from having a plan of it, with the names of the different trees introduced in their proper places. By this means the memory is greatly assisted, especially in extensive grounds, and the various operations performed with more regularity and exactness. The annexed plate contains the **PLAN OF AN IMPROVED GARDEN**.

GARDEN ENGINE, a sort of pump, contrived for the purpose of watering different sorts of wall or other trees. See **WATERING-ENGINE**.

GARDEN FRAME. See **FORCING-FRAME** and **FRAMR**.

GARDEN IMPLEMENTS, various sorts of tools made use of in the business of practical gardening. See **PLATE ON GARDEN IMPLEMENTS**.

GARDEN ROLLER. See **ROLLER**.

GARCINIA, a genus containing a plant of the tender exotic tree kind for the stove.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a four-leaved perianthium: leaflets roundish, concave, obtuse, spreading, permanent: the corolla has four roundish petals, concave, spreading, a little larger than the calyx: the stamina consist of sixteen filaments (twelve or more), upright;

placed in a cylinder, simple, shorter than the calyx: the anthers roundish: the pistillum is a superior germ, suboval: style scarcely any; stigma flat, spreading, peltate, eight-cleft, obtuse, permanent: the pericarpium is a coriaceous berry, globular, large, one-celled, crowned with the stigma: the seeds eight, convex on one side, angular on the other, villose, and fleshy.

The species cultivated is *G. Mangostana*, Mangostan or Mangosteen.

It rises in its native situation with an upright stem near twenty feet high, sending out many branches on every side, which are placed opposite, and stand oblique to each other, and not at right angles; the bark of the branches is smooth, of a gray colour; but on the tender shoots it is green, and that of the trunk is of a darker colour, and full of cracks: the leaves are entire; they are seven or eight inches long, and about half as much in breadth in the middle, gradually diminishing to both ends, of a lucid green on their upper side, and of an olive colour on the under, having a prominent midrib through the middle, with several small veins running from that to both sides of the leaf. The flower is like that of a single rose, composed of four roundish petals, which are thick at their base, but thinner towards their ends, and of a dark red colour. The fruit is round, the size of a middling orange, the top being covered by a cap. It has a delicious flavour, partaking of the strawberry and grape; being esteemed one of the richest fruits in the world. It is a native of the Molucca Islands.

Culture.—These plants are increased by sowing the seeds in pots filled with light mould, in the situations where they grow naturally, being afterwards brought hither, and when the plants are of sufficient growth removed into separate pots, and plunged in the bark-bed of the stove, due shade being given till they become well established. They should afterwards be managed in the same way as tender exotics.

They are also capable of being increased by planting cuttings of the young shoots in pots of light earth, and plunging them in the bark-bed.

The plants afford variety in stove collections.

GARDENIA, a genus containing a plant of the flowering shrubby kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a one-leaved five-cleft perianthium, superior: divisions upright, permanent: the corolla is one-petalled, funnel-form, or salyer-form: tube cy-

lindric, longer than the calyx: border flat, five-parted: the stamina have no filaments: anthers five, inserted into the mouth of the tube, linear, streaked, half the length of the border: the pistillum is an inferior germ: style filiform or club-shaped: stigma standing out, ovate, obtuse, two-lobed, often furrowed: the pericarpium is a berry (berryed drupe), dry, one-, two-, or four-celled: the seeds very many, flattened, imbricate, in rows (two rows in each cell).

The species cultivated are: 1. *G. florida*, Fragrant Gardenia, or Cape Jasmin; 2. *G. aculeata*, Round-leaved Gardenia.

The first has a large and woody stem, sending out many branches, which are first green, but afterwards the bark becomes gray and smooth; the branches come out by pairs opposite, and have short joints; the leaves also are opposite, close to the branches; they are five inches long, and two inches and a half broad in the middle, lessening to both ends, terminating in a point; they are of a lucid green, having several transverse veins from the midrib to the borders; they are entire, and of a thick consistence. The flowers are produced at the ends of the branches, sitting close to the leaves. When fully blown, the double flower is as large as a middling rose. It has a very agreeable odour on the first approach, something like that of the orange-flower, but, on being more closely smelt to, like the common double white Narcissus. It is a native of the Cape, flowering in July or August.

It varies with single and double flowers.

The second species is a small shrub rising by a branched stalk, and shooting commonly to the height of seven or eight feet; the main stem tough and hard; the branches somewhat prickly at the ends; the leaves of an oval form, and growing in tufts. It is a native of the West Indies.

Culture.—The first sort may be increased by planting cuttings of the young shoots in pots of light rich mould, in the summer season, plunging them in a moderate tan hot-bed, and covering them close with bell-glasses, giving due shade till they have stricken root. When this has been fully effected, they should be carefully removed into separate small pots, and replunged in the hot-bed. When they are become well established, they should be gradually inured to the influence of the air.

The second sort may be raised by sowing the seeds in pots filled with light fresh earth in the early spring months, plunging them in a bark hot-bed, frequent slight waterings being given. After the plants come up they should have free air in fine weather, and be often watered. When of some growth they should be carefully re-

moved into separate pots, and be replaced in the hot-bed, due shade being given till they are re-established, when they must have air and water in proportion to the warmth of the season. As the autumn approaches they should be removed into the bark-bed of the stove, where they are best kept the two first seasons; but they may afterwards be exposed in the open air in the hot summer months.

These plants are valuable for the variety which they afford in stove collections.

GARLICK. See **ALLIUM**.

GARLICK-PEAR. See **CRATEVA**.

GELDER ROSE. See **VIBURNUM**.

GENISTA, a genus containing plants of the low shrubby deciduous and evergreen kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, small, tubular, two-lipped: upper lip two-toothed, more deeply divided; lower three-toothed, nearly equal: the corolla is papilionaceous: banner oblong, remote from the keel, the whole reflex: wings oblong, loose, shorter than the others: keel straight, emarginate, longer than the banner: the stamina have ten filaments, connate, emerging from the keel: anthers simple: the pistillum is an oblong germ: style simple, rising: stigma sharp, rolled in: the pericarpium is a roundish legume, turgid, one-celled, two-valved: the seeds solitary, usually kidney-form.

The species chiefly cultivated are: 1. *G. tinctoria*, Common Dyer's Genista, or Broom; 2. *G. sagittalis*, Jointed Genista, or Broom; 3. *G. florida*, Spanish Dyer's Genista, or Broom; 4. *G. pilosa*, Hairy Genista, or Broom; 5. *G. Anglica*, English Genista, Petty-white, or Needle-Furze; 6. *G. candicans*, Hoary Genista, or Montpellier Cytisus; 7. *G. Canariensis*, Canary Genista, or Cytisus.

In the first the roots creep far and wide. The stems are many, angular, tough, from a foot to eighteen inches or two feet in height, sometimes more; the branches subdivided, ending in short spikes of yellow flowers, with stipules between them. The leaves alternate, sessile, quite entire, acuminate, an inch long, and two lines broad, smooth, except that the edges and the nerve underneath are slightly villose. It is a native of most parts of Europe.

The second species sends out several stalks, which spread flat on the ground, and divide into many flat branches which are jointed, and their two sides are edged like a broad-sword; they are herbaceous but perennial. At each of the joints is placed one small sessile spear,

shaped leaf, ending in a point, of a deep-green colour and smooth. The flowers are produced in close spikes at the ends of the branches, and succeeded by short hairy pods, which contain three or four kidney-shaped seeds. It is a native of France.

The third rises with woody stalks two or three feet high, sending out many taper channelled branches, which grow erect. The leaves are small, alternate. The spikes of flowers terminating; succeeded by short pods, which turn black when ripe, and contain four or five kidney-shaped seeds. It is a native of Spain, flowering in June and July.

The fourth species differs from the first in having the branches depressed on every side and procumbent, while that is upright. The root is long, running obliquely, and furnished with many small fibres. The stem a foot in length or more, much branched, and tough; the old branches naked, the young ones clothed with numerous, minute, oval or oval-lanceolate leaves, entire, smooth on the upper surface, beneath covered with long white silky hairs. The flowers are in short spikes on the summit of the branches, on short hairy peduncles. It is a native of Sweden, flowering in May.

The fifth has the stem much branched: the branches tough, without leaves, furnished with extremely sharp slender thorns, from a quarter to half an inch in length; the shoots of the year grow in bundles on the summits of the old ones, and sparingly from the sides, bearing numerous, small, light green, oval or lanceolate, smooth, entire leaves, intermixed with soft spines. The flowers are small, pale yellow, and few. It is a native of Britain.

The sixth species rises to the height of seven or eight feet, sending out many slender branches, the upper parts of which, for more than a foot in length, send out small flowering-branches on their sides, supporting five yellow flowers, which appear in June and July. It is a native of Spain.

The seventh has the leaves obovate, somewhat mucronate; but the floral leaves subsessile and minute. The calyx is trifid, the lowest segment three-toothed. The flowers are in corymbs, five or six together, and sweet-scented. It is a native of the Canaries.

Culture.—The first six hardy sorts are all capable of being raised by sowing the seeds in beds of common earth, or, which is better, in the places where they are to remain, in the early autumn or spring; but the former is the more advantageous, as much time will be saved. Where raised in beds, the plants must be carefully taken up and removed, when they have

had a twelvemonth's growth, to the places where they are to remain; but in the other method require no other culture, but proper thinning out and being kept clean.

The last sort may be increased by sowing the seeds in pots of good mould in the spring, plunging them in a moderate hot-bed. When the plants have attained a few inches in growth, they should be removed into separate pots, and be replunged in the hot-bed. They afterwards require the same sort of management as other less tender green-house plants.

All the first sorts are well adapted to the fronts and other parts of clumps and borders in ornamented grounds, by their flowery nature; and the last affords a fine effect in the green-house by its evergreen property.

GENTIAN. See **GENTIANA.**

GENTIANA, a genus of plants of the hardy herbaceous perennial flowery kind.

It belongs to the class and order *Petandria Digynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a five-parted perianthium, sharp: divisions oblong, permanent: the corolla has one petal, tubular at bottom, imperforate, at top five-cleft, flat, withering, various in form: the stamina have five filaments, subulate, shorter than the corolla: anther simple: the pistillum is an oblong germ, cylindric, length of the stamens: styles none: stigmas two, ovate: (germ superior; style simple, or two sessile stigmas.) the pericarpium is an oblong capsule, columnar, acuminate, slightly bifid at the tip, one-celled; two-valved: the seeds numerous, small, fixed all round to the walls of the capsule: receptacles two, each fastened longitudinally to a valve.

The species cultivated are: 1. *G. lutea*, Yellow Gentian; 2. *G. punctata*, Spotted-flowered Gentian; 3. *G. asclepiadea*, Swallow-wort-leaved Gentian; 4. *G. acaulis*, Dwarf Gentian, or Gentianella.

The first has a thick root, of a yellowish brown colour, and very bitter taste: the lower leaves are petioled; oblong-ovate, a little pointed, stiff, yellowish green, having five large veins on the back, and plaited: the stem three or four feet high or more, with a pair of leaves at each joint, sessile or almost embracing, of the same form with the lower ones, but diminishing gradually to the top: the flowers are in whorls at the upper joints. It is a native of Switzerland, flowering in June and July.

The second species has the leaves ovate, elongated, and strict: the calyxes shallow, and in form of a basin, the calycine teeth narrow, sharp, and not very leafy: the corolla is of a

papery substance, extremely thin, of a dull and very pale greenish straw-colour, with very minute dots thickly and irregularly scattered over it: the segments of the border commonly seven, sometimes eight, but very seldom six, always shorter, narrower, contiguous, rounded, blunt, without any auricles at the base; and finally the bellying of the corolla is blunter and almost the same over the whole bell. It is a native of Austria.

The third has the stem upright near a foot high: the leaves smooth, about two inches long, and three quarters of an inch broad at the base, embracing there, and ending in an acute point; they are of a fine green, have five longitudinal veins, joining at both ends, but diverging in the middle, and diminish in size as they are nearer the top: the flowers are in pairs opposite, on short peduncles; pretty large, bell-shaped, and of a fine blue colour. It is a native of Switzerland, flowering in July and August.

The fourth species has a large woody branched root: a set of ovate-lanceolate leaves spreads on the surface: the stem from one to three inches in height, with one or two pairs of leaves on it, and terminated by one very large, upright, handsome flower (in the garden, when the plants are strong, there are sometimes more,) which is of a deep azure blue, dotted on the inside. It is a native of Austria.

Culture.—The three first sorts are easily raised, by sowing the seed in pots soon after it is ripe, as when kept till the spring it will not succeed: the pots should be placed in a shady situation, and kept clean from weeds. Some advise their being sown where they are to remain, but the first is probably the best method. In the spring the plants appear, when they must be duly watered in dry weather, and kept clean from weeds till the following autumn; then be carefully shaken out of the pots, so as not to break or injure their roots; and a shady border of loamy earth should be well dug and prepared to receive them, into which they should be put at about six inches distance each way, the tops of the roots being kept a little below the surface of the ground, and the earth pressed close to the roots. If the following spring prove dry, they should be duly watered, to forward their growth. The plants may remain here two years, by which time they will be fit to transplant where they are designed to grow, removing them in the autumn, as soon as their leaves decay, great care being taken in digging them up, not to cut or break their roots, as that greatly weakens them. They require afterwards no other culture, but to dig the ground about them early in the spring before they begin to shoot, and in the summer to keep



Painted by J. Edwards

London Published Oct. 1845 by J. Koster, Fleet Street

Engraved by E. Rogers

1 *Gentiana acanthus.*
Large flowered Gentian.

2 *Glycine rubicunda.*
Daisy-flowered Glycine.

them clean from weeds. The roots continue many years, but the stalks decay every autumn; the same roots not flowering two years together, or seldom oftener than every third. When they flower strong, they have, however, a fine appearance.

The first is mostly propagated by off-sets or parting the roots, and planting them where they are to remain in the early autumn; but in order to have the plants flower well, they must not be often transplanted or parted.

They are also capable of being raised from seeds managed as the first sorts.

They all succeed the most perfectly in moist loamy soils, where there is a degree of shade.

All the sorts are useful as ornamental plants, for the various clumps, borders, and quarters of pleasure-grounds; those of low growth being planted towards the fronts, and the latter kinds more backward.

GERANIUM, a genus containing plants of the herbaceous perennial kinds.

It belongs to the class and order *Monadelphia Decandria*, and ranks in the natural order of *Grinales*.

The characters are: that the calyx is five-leaved: leaflets ovate, acute, concave, permanent: the corolla has five petals, obcordate or ovate, spreading, regular: nectary five honeyed glands, fastened to the base of the longer filaments: the stamina consist of ten filaments, awl-shaped, connected slightly at the base, spreading at top, shorter than the corolla: anthers oblong, versatile: the pistillum is a five-cornered germ, beaked: style awl-shaped, longer than the stamens, permanent: stigmas five, reflex: the pericarpium is a five-grained capsule, beaked, the cells opening inwards, each having a simple naked tail fixed to it: seeds solitary, and ovate-oblong.

This extensive genus has been subdivided into *Erodium* with five, and *Pelargonium* with seven fertile stamens.

The species are: 1. *G. phœum*, Dark-flowered Crane's-Bill; 2. *G. nodosum*, Knotty Crane's-Bill; 3. *G. striatum*, Streaked Crane's-Bill; 4. *G. Sibericum*, Siberian Crane's-Bill; 5. *G. sanguineum*, Bloody Crane's-Bill; 6. *G. macrorhizum*, Long-rooted Crane's-Bill.

Other species may be cultivated.

The first has upright stems, nearly cylindrical, from eighteen inches to two and even three feet in height, below woolly, and having a few long shining hairs on them; joints large, commonly tinged with red: the leaves are soft, the younger ones silky, ribbed; the lower on long petioles in pairs, the upper solitary; lobes mostly five, unequally toothed, the lateral ones lobed: the lower leaves have frequently six or seven lobes, and the uppermost only three or four. The flowers are of a

blackish purple colour. It is a native of Switzerland, &c.

The second species is herbaceous, with smooth shining stems, swelled at the joints, having knobs like little bulbs at the origin of the branches and peduncles; whence the name: the flower-leaves are petioled, three-lobed, ovate-acuminate, serrate; the upper ones smaller, subsessile, the middle segment larger than the others. The flowers are of a purple colour. It is a native of Dauphiné, flowering in July and August.

The third has a perennial root, sending up many branching stalks a foot and half high: the leaves are light green; those on the lower part of the stalk have five lobes, and stand upon long foot-stalks; those on the upper part have but three lobes, sit closer to the stalks, and are sharply indented on the edges; they are gashed, and have a ferruginous or purplish brown spot at their base: the peduncles are long and slender: the petals obtuse, deeply indented at top, of a dull white, finely reticulated with many purple veins. It is a native of Italy, flowering in May and June.

The fourth species has also a perennial root: the stems are herbaceous, annual, diffusely dichotomous, jointed, almost round and smooth. At the divisions on each side is a lanceolate acuminate stipule: the leaves are opposite, five-parted, divided into unequally pinnatifid acute segments: the peduncles are longer than the leaves, from the axils, with two bracts at top: the calycine leaflets somewhat hirsute, with short awns: the petals are pale purplish, without any streaks, scarcely longer than the calyx, either quite entire or slightly emarginate. It is a native of Siberia, flowering in June.

The fifth has a perennial, somewhat woody root: the whole plant is set with white spreading hairs: the stems a foot or more in height, lax, spreading, branched, round, jointed, swelling at the joints: the leaves opposite, deeply lobed and cut, sometimes seven-parted, the segments linear, the upper surface rough, the lower hairy, the edge also is hairy and entire: the peduncles axillary, much longer than the leaves, hairy, with a joint and two small bracts more than half way down. Calycine leaflets oval, with membranaceous reddish edges, and terminated by a short red awn: the petals are obcordate, very large, pale red, with deeper veins, hairy at the base. The whole plant frequently turns red or purple after flowering. It is a native of many parts of Europe, flowering most part of the summer.

There are varieties, with short spreading stems and smaller leaves and flowers, with larger leaves deeply divided, and with variegated or striped flowers.

The sixth species has a perennial root, the thickness of a finger, becoming woody, dark purple on the outside, round, single, or branched, having many long, round, thickish fibres. Hence springs a bundle of leaves, and several almost upright stems, or rather scapes. These are all very soft and smooth, with a very short close down. Most of the leaves are large subpetate-seven-parted, on very long petioles; the lobes are oblong, a little narrowed towards the base, serrate-toothed; the edges tinged with pale red; the petiole round, strong, erect; as are also the scapes, which are somewhat higher than the leaves, silky-tomentose, quite simple, leafless, terminating in two peduncles, or else simply two-flowered; the flowers are large, elegant, deep red, or bright purple; and the whole plant, when rubbed, emits an agreeable odour. It is a native of Italy, flowering in May and June.

Culture.—All these plants may be increased either by sowing the seeds or parting the roots. In the first method the seeds should be sown in the autumn as soon as they are become perfectly ripe, either in pots, or a shady border, where the soil is light and fine. When the plants have a few inches growth, they may either be pricked out into other pots or beds at five or six inches distance, or be suffered to remain till the following autumn or spring, when they may be removed into other pots, or be set out where they are to remain, being occasionally supplied with water.

In the second method, the roots should not be too much divided, and be planted in the early part of the autumn, where the plants are to remain.

They are most of them of hardy growth, succeeding in most sorts of soils, requiring little culture, except that of being kept clean from weeds.

They are all proper for affording variety in the borders and other parts of ornamented grounds, and the potted sorts in collections about the house.

GEUM, a genus containing plants of the herbaceous perennial kind.

It belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is a one-leaved perianthium, ten-cleft, uprightish: segments alternately very small, sharp: the corolla has five petals, rounded: claws the length of the calyx, narrow, inserted into the calyx: the stamina have numerous filaments, subulate, length of the calyx, into which they are inserted: anthers short, broadish, blunt: the pistillum has numerous germs, collected into a head: styles inserted into the side of the germ, (terminating

hairy, long: stigmas simple: there is no pericarpium: common receptacle of the seeds oblong, (columnar,) hirsute, placed on the reflex calyx: the seeds numerous, compressed, hispid, awned, with a long style.

The species are: 1. *G. Virginianum*, American Avens; 2. *G. montanum*, Mountain Avens; 3. *G. rivale*, Water Avens.

The first has the stem a foot and half or two feet high, branching at top into small peduncles, each terminated by a small white flower. It is a native of North America, flowering in July and August.

In the second species, the root-leaves are in a tuft, on petioles of different lengths; these are hairy, and have several pairs of leaflets on them; the lowest very small, the succeeding ones gradually larger, and the pair immediately under the great terminating leaflet much bigger than any of the rest: the extreme leaflet is two or three inches in length and breadth, obscurely lobed, gash-serrate, and veined: the leaves of the stem sessile, solitary, alternate, trifid: the pinnae smaller and more crowded than in the others, sessile and gash-serrate: the stem is unbranched, from a span to a foot and half in height: the flowers are large, solitary, spreading, upright, of a yellow colour. It is a native of France, flowering in June and July.

There is a variety, with large golden flowers.

The third has a creeping, reddish, astringent, aromatic root, smelling like cloves: the stem a foot high, upright, round and branched, bending at top, but becoming erect as the fruit ripens: the leaves are lyrate, jagged, gash-serrate and hirsute: stipules undivided or jagged: the peduncles purplish, hirsute with hairs terminating in a red globule; becoming less bent as the seeds ripen. It is a native of most countries of Europe; flowering from May till the autumn.

It varies with yellow flowers, and with double flowers.

Culture.—All these plants are capable of being increased, both by seeds and parting the roots.

The seeds should be sown in the early autumn in the situations where the plants are to grow, or in a shady situation, to be removed when of a proper growth.

The partings of the roots may be planted out where the plants are to remain in the early part of the autumn, when the weather is mild, and rather moist.

These plants are hardy, and require little cultivation afterwards.

They afford ornament and variety in the borders and clumps of pleasure-grounds among other flowering plants.

GILLIFLOWER. See DIANTHUS.

GLADIOLUS, a genus comprising plants of the tuberous-rooted flowery perennial kind.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatae*.

The characters are: that the calyx is a spathe, two-valved, inferior; shorter than the corolla: valves oblong, permanent; the outer one larger, inclosing the inner: the corolla is one-petalled, superior: tube cylindric, bent: border somewhat bell-shaped, six-parted; segments oblong, from erect-patulous, the uppermost and lowest lateral either without or within: the stamina have three filaments, inserted into the orifice of the tube, filiform, shorter than the corolla: anthers ovate, incumbent: the pistillum is an inferior germ, triangular: style filiform: stigmas three, rolled back and spreading, blunt, villose: the pericarpium is an ovate capsule, three-cornered, blunt, three-celled, three-valved: the seeds very many and smooth.

The species are: 1. *G. communis*, Common Sword-Lily, or Corn-Flag; 2. *G. imbricatus*, Imbricated-flowered Gladiolus; 3. *G. tristis*, Square-stalked Gladiolus; 4. *G. angustus*, Narrow-leaved Gladiolus; 5. *G. cardinalis*, Superb Scarlet Gladiolus.

The first has a yellowish, round, compressed root covered with a brown furrowed skin; hence spring two sword-shaped leaves, embracing each other at the base, and between them rises the flower-stalk, growing near two feet high, having one or two narrow leaves embracing it like a sheath, and terminated by five or six purple flowers, one above another at some distance, ranged on the same side of the stalk: the spathe covers the flower-bud before it expands, but splits open lengthwise when it opens, and shrivels up to a dry skin, remaining about the seed-vessel till the seeds are ripe.

It is divided by Mr. Miller into three species, as the common sort described above, with the flowers disposed on one side the stalk, varying with white and flesh-coloured flowers, called *Italian Corn-flag*; the Italian, with flowers on each side the stalk, of which there is a variety with white flowers, named *French Corn-flag*; and the Great Corn-flag of Byzantium, which has larger roots, but of the same form; the leaves are much broader and larger, with deeper channels: the flower-stalks rise higher, the flowers are much larger, of a deeper red colour, and the sheaths longer. This is the sort mostly cultivated, which makes a fine appearance when in flower, and the roots do not increase so as to be inconvenient.

Besides these, according to some, there are three other varieties; the Blush, the White, and the Small Purple.

In the second species the leaves are sword-

shaped, and the flowers small, being all directed one way, and imbricate. It is a native of Russia.

In the third come out two or three narrow leaves from the root, a foot and half long, having a longitudinal furrow in the middle, and ending in acute points; they are of a deep green, and stand erect. Between these arises a slender taper stalk, about the same length as the leaves, having one or two short acute-pointed leaves on the lower part, embracing the stalk at their base: the flowers are alternate, distant: the tube of the corolla curved downward, and not so long as in most of the other sorts; segments acute, and nearly equal; pale yellow or sulphur colour. It is a native of the Cape, flowering in the end of May.

The flowers vary much with different shades of white and green, yellow, flesh-coloured, blue, purple and violet. It is commonly said to produce only two flowers on a stem, but there are frequently more, which generally give forth a most agreeable fragrance in their expansion.

The fourth species has a simple scape, or but little branched, sheathed, round, striated, smooth, flexuose-erect, a foot high: the leaves are from long sheaths, ensiform, marked with white elevated streaks, entire, smooth, shorter than the scape; the upper ones gradually smaller; the flowers all on the same side, ascending, on one or two spikes, a hand in length: the rachis angular, flexuose, twisted, smooth: the spathe the length of the tube of the corolla, shorter than the branches, green: the segments of the border of the corolla usually waved.

In the fifth the flowers are fine scarlet, with large white somewhat rhomboidal spots on several of the lowermost divisions of the corolla: strong plants will throw up a stem three or four feet high, dividing at top into several branches. It flowers here in July and August; and is probably a native of the Cape.

Culture.—The first sort and varieties are capable of being readily increased, by planting the off-sets from the old roots in the beginning of the autumn, in the places where the plants are to remain.

The other sorts may likewise be raised in the same way as well as by seeds. These should be planted in a warm border, and be protected in the winter by glasses or some other means, when there is a necessity for it.

When raised from seed it should be sown towards the end of August, in pots filled with light earth, placing them in a shady situation at first, but afterwards where they may be exposed to the sun, being protected during the winter in a hot-bed frame, free air being admitted when the weather is mild. In the spring the pots should be removed to a shady situation, with

only the morning sun. When the stems decay, the roots should be taken up and kept in sand in a dry place, till the time of planting. In the second year's planting, they should be put in separate small pots.

The old roots may be taken up every two or three years, to have the off-sets taken off from them.

They produce a fine effect and variety in the flower borders and other parts among other flowering plants.

GLASS CASE, a light sort of erection formed with glass sashes, in proper frame-work, mostly upright in the front part and ends, but sloping at top from a back wall, or other convenient building, to the fore part; the front, top, and both ends being of glass-work. The situation for this purpose should face the south, in order to have the full influence of the sun. Constructions of this nature are useful for protecting many sorts of curious tenderish plants in winter, which want it only occasionally from severe frost, and other similar causes.

Buildings of this kind may be constructed occasionally, either against some ready-built south wall, which serves for the back, all the other parts forward being wood-work and glass; or detached in a similar situation, so as that the whole front may stand to the south, the back being formed of brick-work, &c. or of wood double planked; but the former is preferable; the whole being generally ranged lengthways, nearly east and west.

The dimensions may be from five or six, to eight or ten feet in width, by ten, fifteen, or twenty feet in length or more, as may be required; and from six or eight, to ten feet high behind, by five or six, to seven or eight in the front, both ends in proportion with the top, sloping gradually, as just noticed, from the back, having an entrance or door in front, or at one end. The glass-work should be made to slide.

Sometimes fire-flues are carried along the back and front internally, proceeding from an external furnace, for occasional fire-heat in winter, which render them more convenient and useful for different purposes.

These Cases, as mentioned above, are used as preservatory departments, in which to winter many sorts of curious exotics, of the hardier green-house kinds, which only want protection from severe cold, as well as many choice kinds of the open ground which are rather tenderish in their minor growth, or any other particular or curious hardy plants, whether flowers, shrubs, or young trees, especially the choice evergreen kinds, which require effectual protection from the ravages of rigorous frosts or cutting winds in winter or early spring; and at the same time, in mild open weather, to

enjoy the full air by opening the glasses; all which, being in pots, can be readily placed in this preservatory at the approach of severe weather, and be thus kept in good condition till settled weather in spring, &c. then removed into the full air: in summer and autumn, when unoccupied in this way, these Cases may be of utility to place some kinds of curious tender plants in when in flower for seeding, to guard them from heavy or incessant rain or cold night dews in autumn, which in many sorts retard, or sometimes wholly frustrate their production of good seed, as in some sorts of curious tender Annuals, particularly the fine Double Balsams, Cock's-Combs, Tricolors, Double Stramoniums, Diamond Ficoides, and various others.

They are also capable of being used in spring and the early part of summer, as April, May, and June, as a kind of drawing-frames, for some particular sorts of curious Annuals, to bring them to a tall growth, such as the Large or Giant Cock's-Combs, Tricolors, Double-Stramoniums, Double-striped Balsams, Egg-plants, &c. the plants being first raised in hot-beds under garden-frames, till of twelve or fifteen inches growth, then a hot-bed made in the Glass-Case, earthed at top, and the plants in pots singly plunged into the earth of it; the glasses in these cases being shut close, only a necessary admission of fresh air being given every day, by which they run up to a tall stature, in the best perfection of strength for flowering. See ANNUAL PLANTS.

These glass cases are also sometimes made use of as a kind of appurtenances to hot-houses or stoves detached from them, having, as observed above, internal flues for fire-heat when necessary, serving as preservatories for many sorts of exotics, which are tenderer than common green-house plants, but do not require the constant full heat of the more tender hot-house kinds, but only the assistance of moderate fire-heat in winter, in cold nights, or when very damp, cloudy, foggy weather and severe frosts prevail. They are sometimes used in the business of forcing different kinds of flowering plants and esculents, either by means of an internal bark-bed, or flues for fire-heat.

When intended for this purpose, it is convenient to have both an internal pit for a bark-bed, and flues for fire-heat, in order to use either separately, or sometimes both, as it may be found necessary.

GLASTONBURY THORN. See *MESPILUS*.

GLEDITSIA, a genus containing a plant of the deciduous tree kind.

It belongs to the class and order *Polygamia Dioecia*, and ranks in the natural order of *Lomentaceae*.

The characters are: that the male has a long, compact, cylindric ament: the calyx is a perianthium proper, three-leaved, (three-cleft,) leaflets patulous, small, acute: the corolla has three roundish petals, sessile, patulous, like the calyx: nectary turbinate, with the other parts of the fructification growing to the mouth: the stamina have six filiform filaments, longer than the corolla; anthers incumbent, oblong, compressed, twin: hermaphrodite in the same ament with the males, usually terminating: the calyx is a four-cleft perianthium, otherwise as in the male: the corolla has four petals, otherwise as in the male: nectary as in the male: the stamina as in the males: the pistillum, pericarpium, and seed as in the female: female a lax ament, on a distinct plant: the calyx is a perianthium proper, as in the male, but five-leaved (five-cleft): the corolla has five petals, long, sharp, from upright spreading: nectaries two, short, like filaments: the pistillum is a broad germ, flattened, longer than the corolla: style short, reflex: stigma thick, the length of the style, along which it grows, pubescent at top: the pericarpium is a very large broad legume, extremely flattened, divided by several transverse partitions, and filled with pulp: the seeds solitary, roundish, hard, shining.

The species is *G. triacanthos*, Three-thorned Acacia.

It is a tree common in most parts of North America, where it is known by the name of Honey Locust. It rises with an erect trunk to the height of thirty or forty feet, and is armed with long spines, three or four inches long, which have two or three smaller ones coming out from the side, and are frequently produced in clusters at the knots of the stem. The leaves are bipinnate, composed of ten pairs of leaflets, of a lucid green colour, and sessile. The flowers come out from the side of the young branches, but, being of a herbaceous colour, have little appearance.

In this climate the leaves seldom come out till June, and the flowers not till the end of July; the tree does not produce flowers till it is of a large size.

There are varieties with fewer spines, and the leaves smaller, the pods oval; with but one seed; and with stronger spines.

Culture.—These trees are capable of being increased by sowing the seeds obtained from America, in a bed of light earth in the early spring, water being occasionally given when the weather is dry. But it is a more expeditious practice to sow them in pots, and plunge them in a moderate hot-bed. They should be kept clean during the first summer, and in the win-

ter be protected from sharp frosts, especially those plants that are in pots. In the following spring the young plants may be most of them removed into nursery-rows at a foot or eighteen inches distant, with eight or ten inches in the rows. The small ones that remain may be put out in the following autumn or spring. They should remain in this situation till they have had two or three years growth, when they may be planted where they are to remain any time in the later part of the spring.

They succeed best in light deep soils in sheltered situations.

These are all very ornamental trees, being well suited to plantations and large shrubbery parts, and when planted alone in large openings or lawns kept in grass they produce a fine effect, but have the disadvantage of putting forth their leaves late.

GLOBE-AMARANTH. See *GOMPHRENA*.

GLOBE-FLOWER. See *TROLLIUS*.

GLOBE-THISTLE. See *ECHINOPS*.

GLOBULARIA, a genus comprising plants of the herbaceous flowery perennial kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatae*.

The characters are: that the calyx is a common perianthium, imbricate, with scales the length of the disk and equal: proper one-leaved, tubular, five-cleft, sharp, permanent (four- or five-toothed; the teeth bristle-shaped and acuminate): corolla is universal, nearly equal: proper monopetalous, tubular at the base: border five-parted: upper lip very narrow, two-parted, shorter: lower of three larger, equal segments: the stamina have four filaments, simple, the length of the corollule: anthers distinct, incumbent: the pistillum is an ovate superior germ: style simple, the length of the stamens: stigma obtuse: there is no pericarpium: proper calyx converging, inclosing the seed: the seeds are solitary and ovate: the receptacle is common, oblong, separated by chaffs.

The species chiefly cultivated are: 1. *G. Alypum*, Three-tooth-leaved Globularia; 2. *G. vulgaris*, Common Globularia, or Blue Daisy.

There are other species that may be cultivated.

The first has a hard woody stem, about two feet high, with many woody branches, beset with leaves like those of the myrtle. The flowers are produced on the tops of the branches in a ball, and are of a blue colour. It is a native of the south of Europe, flowering from August to November.

This shrub is said to possess a violent purging quality.

The second species has the stem slender, upright, covered with leaves, from an inch and half to six inches in height, and sometimes more, somewhat angular, very simple, smooth, one-flowered. The root-leaves are numerous, like those of the daisy, but thicker, petioled, placed in a ring, ovate, obtuse, quite entire, emarginate, the nerve produced into a small awn or point: the stem-leaves alternate, nearer to sessile, smaller, three-toothed, four lines broad, from an inch to an inch and a half in length, all smooth, and of a bright green. The flowers are in a globular head, and of a blue colour. It is a native of many parts of Europe, flowering in May and June.

It varies with a white flower, and with a leafless stalk or stem.

Culture.—The first species may be increased by planting cuttings of the young branches in April, just before they begin to shoot, in pots of light fresh mould, plunging them in a very moderate hot-bed, giving them due water and shade till they have stricken root. After this they should be removed from the bed, and gradually hardened to the open air. The plants should afterwards be protected during the winter.

The second sort is readily increased by parting the roots as in the Common Daisy, planting them out in the early part of the autumn in moist shady situations. They succeed best in such loamy soils as are rather moist.

These plants are ornamental, the first sort among potted plants, the latter in the fronts of the more moist and shady borders or clumps of pleasure-grounds.

GLORIOSA, a genus containing a plant of the herbaceous flowering perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx: the corolla has six petals, oblong-lanceolate, waved, very long, woolly reflex: the stamina have six subulate filaments, shorter than the corolla, from straight patulous: anthers incumbent: the pistillum is a globular germ: style filiform, longer than the stamens, inclined: stigma triple, obtuse: the pericarpium is a superior capsule, oval, three-lobed, three-celled, three-valved: the seeds several, globular, berried, in two rows.

The species is *G. superba*, Superb Lily.

It has a long fleshy root of a whitish colour, and a nauseous bitter taste, from the middle of which arises a round weak stem, requiring support, and with that growing to the height of eight or ten feet. The leaves are smooth, about eight inches long, and one inch and a half

broad at the base, growing narrower till within two inches of the end, which runs out in a narrow point, and ends in a tendril: the flowers are at the upper part of the stem, from the side, on slender peduncles, hanging down, at first of a herbaceous colour, but changing to a beautiful flame-colour. It is a native of Guinea, flowering in June and July. The roots and other parts are poisonous.

Culture.—This plant is capable of being increased by planting the offsets from the old roots, either in the autumn after the stems decay, or in the early spring before they shoot, in pots filled with light earth, plunging them in the bark-bed of the stove. The old roots, when taken out of the ground, should be preserved in dry sand during the winter in the stove, or in a dry warm room. It is the practice of some to let the roots remain during the winter in the mould, keeping the pots in the tan-bed; planting out the offsets early in the spring. In either way they should have very little water.

When the stems appear, they should be supported by sticks, and in hot dry weather a little water be sparingly given, as there may be occasion.

The pots in which they are planted should be small, that they may be confined and put forth stronger stems. Twopenny pots will be large enough for roots of the greatest size.

These plants are highly ornamental on account of their beautiful flowers among others of the stove kind.

GLOXINIA, a genus comprising a plant of the herbaceous flowery perennial kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a superior perianthium, five-leaved: leaflets equal, lanceolate, serrulate at the tip, the three upper ones nerved, the two lower bent down with the nectary, permanent: the corolla is monopetalous, irregularly campanulate: tube scarcely any: border oblique, five-cleft, segments roundish, the four upper spreading and entire, the lowest straight, concave, toothed: the stamina have four filaments, with the rudiment of a fifth, two scarcely shorter, inserted into the receptacle, fastened to the lower margin of the corolla, sickled, pubescent, converging laterally above: anthers ovate, two celled, peltate, united within the opening of the corolla: the pistillum is an inferior germ, turbinate, striated: style filiform, the length of the stamens: stigma capitate, the length of the anthers: the pericarpium is a one-celled capsule (or half-celled): receptacles two, opposite, two-parted, fastened to

the sides of the capsule by the partition: the seeds very numerous, inserted into the receptacles.

The species is *G. maculata*, Spotted Gloxinia.

It has a perennial thick fleshy root, divided into knots, which are scaly. The stems are several, about a foot high, thick, succulent, and purplish. The leaves are oblong, thick, sessile, serrate, rough on their upper side, where they are of a dark green, but their under side is purplish. The stems are terminated by short spikes of blue flowers; or rather an erect raceme, leafy or bracted; in which the flowers are axillary, solitary, peduncled, bright blue, and sweet-scented. It is a native of South America.

Culture.—These plants may be readily increased by planting the divided roots in the early spring, in middle-sized pots, filled with good mould, which must be plunged into a fresh tan-bed. After the plants are up they must be often refreshed with a little water, and when the weather is hot have air freely admitted.

They may also be raised from cuttings of the young shoots, planted and managed in the same way in the summer season.

They must be constantly kept in the stove in an open situation, and never transplanted when in leaf, as by that means they are prevented from flowering.

They afford variety in collections of the stove kind.

GLYCINE, a genus containing plants of the shrubby climbing kind.

It belongs to the class and order *Diadelphica Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved, compressed perianthium: mouth two-lipped: upper lip emarginate, obtuse: lower longer, trifid, acute: the middle tooth more produced: the corolla is papilionaceous: banner obcordate, the sides bent down, the back gibbous, the tip emarginate, straight, repelled from the keel: wings oblong, towards the tip ovate, small, bent downwards: keel linear, sickle-shaped, bent upwards, at the tip pressing the banner upwards, obtuse, towards the tip broader: the stamina have diadelphous filaments (simple and nine-cleft), only a little divided at the tip, rolled back: anthers simple: the pistillum is an oblong germ: style cylindric, rolled back in a spiral: stigma obtuse: pericarpium an oblong legume: the seeds kidney-form.

The species are: 1. *G. frutescens*, Shrubby Glycine, or Carolina Kidney-bean Tree; 2. *G.*

bimaculata, Two-spotted Glycine; 3. *G. rubicunda*, Reddish-flowered Glycine; 4. *G. coriacea*, Scarlet Glycine.

The first has woody stalks, which twist themselves together, and also twine round any trees that grow near, and will rise to the height of fifteen feet or more. The leaves are in shape somewhat like those of the ash-tree, but have a greater number of leaflets. The flowers are produced in clusters from the axils, and are of a purple colour. They are succeeded by long cylindrical legumes, shaped like those of the Scarlet Kidney-bean, containing several seeds, which are never perfected in this climate. It flowers from June to September.

The second species rises with a twining shrubby stalk to the height of six or eight feet and more; multiplying greatly by age, becoming loaded with a profusion of purple flowers growing in racemes; the richness of the corolla is enlivened by two green spots at the base of the banner. For the most part the flowers go off in this climate without producing any seed-vessels. It begins to flower in February, and continues during the summer. It is a native of Botany Bay.

The third has a shrubby, slender, twining stem, five or six feet high and more, red, branched, leafy. The leaves ternate, on petioles from an inch to two inches in length, channelled above, round underneath: leaflets ovate or elliptic, quite entire, the two side-ones on very short petioles, the end-one on a petiole half an inch in length, bending and swelling immediately under the leaflet, and having there a pair of deciduous stipules. Almost the whole plant is covered with hairs pressed close.

The flowers are of a purplish-scarlet colour. It is a native of New South Wales, flowering from April to June.

The fourth is a shrubby climbing plant, growing to the height of many feet, if supported, and producing a great number of flowers on its pendent branches. The leaflets nearly round, and in the older ones especially curled at the edges. The flowers for the most part in pairs, of a glowing scarlet colour, at the base of the keel somewhat inclined to purple; the bottom of the banner is decorated with a large yellow spot, verging to green. It flowers from April to June, and is a native of New South Wales.

Culture.—The first sort is increased by laying down the young branches in the early autumn. When well rooted in the following autumn, they may be taken off and planted where they are to remain, or in nursery-rows, being watered when the weather is hot, and the roots

protected in the winter by some sort of strawy material.

They succeed best in dry warm light soils.

The other sorts may be raised by sowing the seeds, when they can be obtained from abroad or produced here, in pots of light earth, in the early spring, being afterwards removed into other pots, and placed in the green-house or Cape stove. Mr. Curtis, however, suggests that the two last may succeed in the open air, when planted out in warm sheltered situations, and protected in the winter season.

They are all ornamental in their flowery climbing nature; the first in the open ground, and the latter in the green-house and stove collections.

GLYCYRRHIZA, a genus furnishing a plant of the herbaceous perennial kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved tubular perianthium, two-lipped, permanent: upper lip three-parted: the lateral segments linear, the middle one broader, bifid: lower entirely simple, linear: the corolla is papilionaceous: banner ovate-lanceolate, straight, longer: wings oblong, very like the keel, but a little larger: keel two-petalled, acute, with a claw the length of the calyx: the stamina have diadelphous filaments (simple and nine-cleft), straight: anthers simple, roundish: the pistillum is a germ shorter than the calyx: style subulate, the length of the stamens: stigma obtuse, ascending: the pericarpium is an ovate or oblong legume, compressed, acute, one-celled: the seeds very few, and kidney-form: calyx two-lipped: upper lip three-parted, lower undivided: legume ovate, compressed.

The species cultivated is *G. glabra*, Common Liquorice.

It has the roots running very deep into the ground, and creeping to a considerable distance, especially where they stand long unremoved. From these arise strong herbaceous stalks, four or five feet high. The leaves are composed of four or five pairs of ovate leaflets, terminated by an odd one: these and the stalks are clammy, and of a dark green. The flowers are in axillary spikes, standing erect, and of a pale blue colour. The pods are short, containing two or three seeds.

This plant is cultivated for its roots, which are useful for different purposes.

Culture.—A light sandy soil is the most adapted to the growth of this sort of crops, as its goodness consists in the length of the roots. The ground in which it is intended to be planted should be well dug and dunged the year be-

fore planting, that it may have become perfectly mellow, and the dung well rotted, and mixed with the earth, otherwise it will be apt to stop the roots from running down and being properly supported; and immediately before planting it should be well dug again to the depth of three spades, and be laid very light.

When thus prepared, fresh plants taken from the sides or heads of the old roots should be provided, care being taken that they have each a good bud or eye, being about ten inches long, and perfectly sound.

The operation of planting them should be performed about the middle of March, which is done in this manner:—a line is first set across the ground, then with a long dibble made on purpose the shoots or cuttings are put in, so that the whole plants may be set into the ground, with the heads about an inch under the surface, in a straight line, about a foot asunder in the rows, and a foot and half or two feet distance row from row.

When the whole spot of ground has been thus planted, a thin crop of onions may be sown over the land. These must be kept perfectly clean by the hoe, care being taken not to cut off the top shoots of the liquorice plants, as it would greatly injure them. All the onions which grow near the heads of the liquorice should also be removed. In October, the shoots of the liquorice should be removed, and a little very rotten dung spread upon the surface.

In the following spring, about March, the ground should be slightly dug between the rows of liquorice, burying the remaining part of the dung, being very careful not to cut the roots.

During the summer they must be kept quite clean by occasional hoeing. The same operations must be annually performed, so as to keep the ground and plants in perfect order.

These plants must remain three years from the time of planting, when they will be fit to take up for use, which should be done when the stalks are perfectly decayed: as, when taken up too soon, the roots shrink greatly, and lose in weight.

In taking up the roots the ground is trenched over row after row to the full depth, and the young shoots taken from the old roots cut into sets for new plantations; which should be made annually, in order to keep a constant succession of roots fit for being taken up.

The great art in this culture is to have the earth well trenched to a proper depth, to have good sets, and to keep the ground afterwards quite clean by hoeing.

GNAPHALIUM, a genus affording plants of the herbaceous and under shrubby kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, rounded, imbricate, with the marginal scales rounded, scarious, coloured: the corolla compound: corollets hermaphrodite, tubular, with apetalous females sometimes intermixt: hermaphrodites funnel-form, with a five-cleft, reflex border: the stamina (in the hermaphrodites) have five capillary filaments, very short: anther cylindric, tubulous: the pistillum is an ovate germ: style filiform, the length of the stamens; stigma bifid, in the females, reflex: there is no pericarpium: calyx permanent, shining: the seeds solitary, oblong, small, crowned with a capillary or feathered down: the receptacle is naked.

The species are: 1. *G. arboreum*, Tree Everlasting; 2. *G. ignescens*, Red-flowered Everlasting; 3. *G. orientale*, Eastern Everlasting, or Immortal Flower; 4. *G. odoratissimum*, Sweet-scented Everlasting, or Eternal Flower; 5. *G. margaritaceum*, American Everlasting, or Eternal Flower; 6. *G. plantagineum*, Plantain-leaved Everlasting; 7. *G. stuechas*, Common Shrubby Everlasting, or Stœchas.

The first is a shrub the height of a man, determinately branched. The leaves resembling those of rosemary, crowded, strict, acute, naked, underneath tomentose, as are also the branches; with smaller leaves alternate, remote. The flowers are of a dusky white colour. It flowers most part of the year.

The second species has the stem and leaves woolly; the former a foot high, sending out a few side-branches, terminated by a compound corymb of flowers, the heads of which are small, of a gold colour, changing to red as they fade or decline. Its native situation is not known.

The third has the stem seldom rising more than three or four inches high, and putting out many heads. The leaves are narrow, woolly on both sides, and coming out without order. The flower-stems eight or ten inches high, with narrow hoary leaves all the way, terminated by a compound corymb of bright yellow flowers in large heads, coming out in May, and continuing in succession most part of the summer. It has been long in Portugal.

It is improperly called Eastern Everlasting, according to Martyn, as it is supposed to be a native of Africa.

There is a shrubby variety with narrow leaves, which differs from the other in rising with stalks four or five feet high, dividing into many branches, having long narrow leaves placed alternately; the corymb is loose, with the

flowers on long pedicles, and with broad leaves.

The fourth species has the lower leaves oblong and blunt. The stems about three feet high, dividing into many irregular branches, on which are oblong blunt leaves, hoary on their under side, but of a dark green above and decurrent. The stems are terminated by a compound corymb of flowers, closely joined together, of a bright gold colour, but small, and changing to a darker colour as they fade. It is a native of the Cape.

The fifth has a perennial root, creeping, and spreading far, so as to become a troublesome weed. The stalks extremely downy and white. The leaves are numerous, long, sessile, growing without order round the stem, entire at the edges, dark green, naked above, beneath covered with a thick down, and whitish. The flowering branches form a broad flat bunch: each branch contains numerous crowded heads, on short branched, downy peduncles, but the middle ones sessile. It is a native of North America.

The sixth is perennial. From the main stalk come out runners, which take root in the ground. The stem-leaves are narrower, woolly, alternate. The flowers in a terminating corymb, white and small, appearing in June and July. It is a native of North America.

The seventh has the stem about three feet high, with long slender irregular branches, the lower ones having blunt leaves two inches and a half long, and an eighth of an inch broad at the end; those on the flower-stalks are very narrow, and end in acute points; the whole plant being very woolly. The flowers terminating in a compound corymb, at first silvery, but turning to a yellow sulphur-colour. When gathered before the flowers are much opened, Martyn says, the heads will continue in beauty many years, if kept from air and dust. It is a native of Germany.

Culture.—The first four sorts may be increased by slips from the heads, or cuttings, by planting them in pots of light earth, in the spring or summer months, and plunging them in a moderate hot-bed, refreshing them often with water. When they have taken full root they may be removed into separate pots, and be placed among other plants of the hardy exotic sort. They require the protection of a frame in the winter season.

The seventh species may be increased in the same manner, being planted at once where it is to remain, in a shady sheltered border or other place.

The fifth and sixth sorts may be easily raised by dividing and planting their creeping roots

where they are to grow, either in the autumn or spring.

These three last are sufficiently hardy to stand the open air in warm situations.

They are all ornamental plants, the former in the green-house collection, and the latter in the open ground.

GOAT'S-BEARD. See *TRAGOPOGON*.

GOAT'S-THORN. See *ASTRAGALUS*.

GOLDEN-FLOWER. See *CHRYSANTHEMUM*.

GOLDEN-ROD. See *SOLIDAGO*.

GOLDEN-TREE. See *BOSEA*.

GOLDILOCKS. See *CHRYSOCEMA* and *GNAPHALIUM*.

GOMPHRENA, a genus containing a plant of the flowery annual kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Amaranthi*.

The characters are: that the calyx is a coloured perianthium; outer three-leaved: leaflets two, converging, keeled: the corolla five-petaled, upright: petal subulate, permanent, rude, villose: nectary a cylindric tube, the length of the corolla; with a five-toothed, patulous mouth: the stamina have five filaments, scarcely observable, within the mouth of the nectary: anthers upright, closing the mouth of the nectary: the pistillum is an ovate germ, with a point: style cloven half way, filiform: stigmas simple, the length of the stamens: the pericarpium a capsule roundish, circumcised: the seed single, large, roundish, with an oblique tip.

The species is *G. globosa*, Annual Globe Aramanth.

It is an annual plant, rising with an upright branching stalk, about two feet high: the leaves are opposite, sessile, quite entire, hispid: branches and peduncles also opposite; the latter axillary, long and naked, except that there are two short leaves close under each head of flowers. These heads at their first appearance are globular, but as they increase in size become oval. It is a native of India.

Martyn observes that the flowering heads are beautiful, and, if gathered before they are too far advanced, retain their beauty several years.

There are varieties with fine bright purple heads, with white or silvery heads, which never alter from seeds, with mixed colours, with purple and with white heads, which two last are much smaller and rounder than the others: the plants also grow much larger, and spread more into branches, and are later before they flower;—these are called Bachelors' Buttons in America.

Culture.—These plants may be raised by sow-

ing the seeds annually in pots of light fresh mould in the early spring months, and plunging them in the bark hot-bed. When the plants are up, they should be watered often with care; and, after they have attained some growth, be removed with balls about their roots into other pots, and replunged into the hot-bed. When they have had some growth in this situation, they should be removed into a deep frame, being placed in a fresh hot-bed, to bring them up tall.

They should here be often refreshed with water, and have air admitted freely as the summer advances, till they are capable of bearing it without injury; when about August they may be set out during the day time, being protected in the night, and from wet weather. At this period they should be watered three or four times a week.

They are highly ornamental plants for the principal situations about the house, in assemblage with other potted plants.

GOOSEBERRY. See *RIBES*.

GOOSE-FOOT. See *CHENOPODIUM*.

GORDONIA, a genus containing plants of the shrubby evergreen exotic kind.

It belongs to the class and order *Monadelphia Polyandria*, (*Polyandria Monogynia*), and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a perianthium (double: outer four-leaved, deciduous; inner five-leaved: leaflets roundish, concave (ciliate) permanent: the corolla has five petals, obovate, concave, large, united at the base (one of them ciliate): the stamina have numerous filiform filaments, coalescing at the base into an obtuse body (campanulate, with a five-cleft border): anthers oval, upright: the pistillum is an ovate germ: style short, five-cornered (cylindric): stigmas five, sharp, horizontal: (stigma five-cornered): the pericarpium is an ovate capsule, ovate, sharp, five-celled: cells bifid half way, five-valved: the seeds two, with a leafy wing on one side, in two rows in each cell.

The species cultivated are: 1. *G. lasianthus*, Smooth Loblolly Bay; 2. *G. pubescens*, Pubescent Loblolly Bay; 3. *G. Franklini*, Carolina Gordonia.

In the first, the stem is five or six feet high, and branched: the leaves four inches long, and one inch and a half broad in the middle, slightly indented on their edges, and of a thick consistence: the flowers axillary, on very long peduncles; of a yellowish white colour. Some describe it as a tall straight tree, with a regular pyramidal head. It is a native of North America, flowering in August and September.

In the second species, the branches are sub-

pubescent: the leaves as in the first, but with the lower surface very softly tomentose: the flowers axillary, solitary, sessile towards the tops of the branches: the leaflets of the outer calyx subovate, acuminate at the tip, tomentose, and of a white colour; also those of the inner. It is a native of South Carolina, flowering in September.

The third is a beautiful tree-like shrub, which rises with an erect trunk to the height of about twenty feet, with alternate branches: the leaves are oblong, narrowed towards the base, serrate, alternate, sessile or subsessile: flowers towards the extremity of the branches, solitary, sitting close in the bosom of the leaves, often five inches in diameter when fully expanded: the petals snow-white, the lower one hollow, formed like a cap or helmet, entirely including the other four, until the moment of expansion; its exterior surface is covered with a short silky hair: the borders of the petals are curled or plaited. It is a native of South Carolina.

The flowers have the fragrance of the China Orange.

Culture.—These plants, from their being aquatics, are not raised or preserved without great difficulty. It is effected by planting cuttings of the young shoots, or laying them down in the spring season in pots of moist earth, plunging them in the hot-bed, and supplying them freely with water. They are very ornamental stove plants.

GORTERIA, a genus containing plants of the herbaceous shrubby sort for the green-house.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositæ Capitatae*.

The characters are: that the calyx is common one-leaved, imbricate with spiny scales, the inner ones gradually longer, straight, bristle-shaped, ridged: the corolla compound radiate: corollets hermaphrodite, several in the disk: female fewer in the ray: proper of the hermaphrodite funnel-form, five-cleft; of the female ligulate, lanceolate: the stamina in the hermaphrodites have five short filaments: anther cylindric, tubular: the pistillum of the hermaphrodite is a villose germ: style filiform, the length of the corollet; stigma bifid: of the females, germ obsolete: style none: stigma none: the pericarpium an unchanged, deciduous calyx: the seeds in the hermaphrodites, solitary, roundish; down simple (woolly): in the females, none: receptacle naked (not so in all the species).

The species cultivated are: 1. *G. rigens*, Great-flowered Gorteria; 2. *G. fruticosa*, Shrubby Gorteria.

The first is a low spreading plant, with woody stalks six or eight inches long, trailing on the

ground, having two or three side-branches, each terminating in a close head of leaves, which are narrow, green on their upper, but silvery on their under surface, and cut into three or five segments at the end. The peduncles which arise from these heads are six inches long, naked, and support one large orange-coloured flower: each floret in the ray has a dark mark towards the base, with white intermixed.

Martyn observes, that the green-house can scarcely boast a more showy plant: the flowers, when expanded by the heat of the sun (and it is only when the sun shines on them that they are fully expanded), exhibit an unrivalled brilliancy of appearance. It flowers in May and June.

The second species has a slender stem, three feet high, sending out a few weak branches, which are tomentose and white: the leaves are, like those of Privet, alternate, sharp, petioled, having six or seven serratures bristly at the end: the flowers terminating, subsolitary, peduncled, the peduncle longer than the flower, of a golden yellow colour. It flowers in August and September.

Culture.—The first sort may be increased by planting cuttings of the young shoots in the summer months, in pots filled with light earth, placing them in the hot-bed under bell- or hand-glasses. When they are become well rooted, they must be carefully removed, and placed in other separate pots, and have the management of other tender plants.

The second sort is raised by planting the small heads from the ends of the branches, in the same manner and at the same season, screening them well from the sun. When perfectly rooted, they should be removed with care into separate pots, and be afterwards well secured against the cold and damp of the winter season, by being placed in a dry green-house, as much air as possible being admitted in mild dry weather.

These are all plants that afford variety and effect among other flowering plants in green-house collections.

GOSSYPIMUM, a genus consisting of herbaceous annual and shrubby perennial plants.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a double perianthium: outer one-leaved, trifid, flat, larger: inner one-leaved, bluntly emarginate in five rows, cup-form: the corolla has five petals, obcordate, flat, spreading, fastened by their base to the tube of the stamens: the stamina have numerous filaments, uniting at bottom into a tube, separate at and below the tip, lax, inserted into

the corolla: anthers kidney-form: the pistillum is a roundish germ: style columnar, the length of the stamens: stigmas three or four, thickish: the pericarpium has a roundish capsule, acuminate, three- or four-celled: partitions contrary: the seeds very many, oval, and involved in cotton.

The species cultivated are: 1. *G. herbaceum*, Common Cotton; 2. *G. arboresum*, Tree Cotton; 3. *G. hirsutum*, Hairy American Cotton; 4. *G. Barbadosense*, Barbadoes Cotton Tree.

The first has a tapering woody root, with numerous fibres, annual: the seed-lobes two, kidney-form, terminating gradually in a long petiole with the figure of a halved funnel: the stem three feet high, upright, round, pubescent, as is the whole of the herb, at bottom brown, with slight chinks, at top spotted with black: the branches are axillary, scarcely longer than the leaf at their origin: the leaves are alternate, only half the length of the petiole, tomentose, odorous whilst young. The flowers are of a yellow colour. It is a native of the East Indies, and often known by the title of Levant Cotton.

The second species has the stem eight feet high, the thickness of the human leg, with a rugged brown bark, and long, diffused, twisted branches: the leaves are three- or five-lobed, without glands, smooth, scattered, petioled; the lobes short: flowers entirely yellow, terminating, and solitary. A native of the East Indies, &c.

The third has a shrubby stem, a fathom in height, erect, striated: the branches hirsute: the leaves alternate; the upper ones divided, cordate, acute, entire, rough with hairs about the edge; the lower three-lobed, the lobes little divided, ovate, acute, entire, hirsute beneath, smooth above: the petioles round, striated, dotted with black, hirsute: there is a single glandular pore on the midrib underneath, and sometimes two or three on the next nerves: the peduncles are three times shorter than the petioles, thick, stiff, hirsute, dotted with black. The flowers are yellow, and succeed by large pods.

The fourth species has the stem from six to fifteen feet in height, suffruticose, biennial, and smooth: the branches are almost erect, round, and smooth or pubescent: the leaves alternate, the upper three-lobed, the lower five-lobed; lobes ovate, acute, nerved, smooth above but pubescent underneath: petioles five or six inches long, roundish, patulous, smooth or sometimes pubescent: glandular pores commonly three, on the midribs of the leaves underneath: the peduncles opposite to the petioles and shorter, thickish, round, striated, pubescent, one-flowered: the flowers are large, yellow, turning finally red, succeeded by oval pods. It is a native of the West Indies.

Culture.—All these plants are raised here from seed, which must be sown in pots filled with light earth, in the early spring months, plunging them in the common or bark hot-bed. When the plants have attained a few inches in growth, they should be removed into separate pots, and again placed in the common or bark hot-bed, where they must constantly remain.

The first and third sorts, as being annual, must have the seeds sown every year. The fourth is perennial, and the last biennial.

They flower and produce seeds in the stove, where a few plants afford much variety.

In the West Indies, where these plants are cultivated for the cotton which they produce, the seed, according to Martyn, is set in rows, about five feet asunder, at the end of September or beginning of October, being at first but slightly covered; but when grown and strong, the root is well moulded up. The seed is apt to decay when it is set too deep, especially in wet weather. The soil should not be stiff or shallow, as this plant has a tap-root. The ground must be hoed frequently, and kept very clean about the young plants, until they rise to a moderate height, otherwise they are apt to be destroyed by caterpillars. It grows from four to six feet high, and produces two crops annually; the first in eight months from the time of sowing the seed; the second within four months after the first; and the produce of each plant is reckoned about one pound weight. The branches are pruned or trimmed after the first gathering; and when the growth is over-luxuriant it should be done sooner. When a great part of the pods are expanded, the wool is picked, and afterwards cleared from the seeds by a machine called a gin, composed of two or three smooth wooden rollers of about one inch in diameter, ranged horizontally, close and parallel to each other, in a frame; at each extremity, being toothed or channelled longitudinally, corresponding one with the other; and the central roller, moved with a treadle or foot-lathe, resembling that of a knife-grinder, which makes the other two revolve in contrary directions. The cotton is laid, in small quantities at a time, upon these rollers, whilst they are in motion, and, readily passing between them, drops into a sack, placed underneath to receive it, leaving the seeds which are too large to pass with it behind. The cotton thus discharged from the seeds, is afterwards hand-picked, and cleansed thoroughly from any little particles of the pods or other substances which may be adhering to it. It is then stowed in large bags, where it is well trodden down, that it may lie close and compact; for which purpose some water is occasionally sprinkled upon the outside of the

bag. An acre usually produces about two hundred and seventy pounds on an average. For this use the first and last sorts are mostly cultivated.

GOURD. See **CUCURBITA**.

GRAFT, the shoot or scion which is to be inserted into the stock or branch in the operation of grafting. It is sometimes termed *graft*. Shoots or scions for this use should be cut according to the directions given on grafting, and be always made from such as are not too luxuriant in their growth or infected with disease, such as the canker, &c. See **GRAFTING**.

In this operation, though the vessels of the stock and those of the shoot are joined by the process of inosculation, and those of the latter supplied with nutritious materials from the stock, their economy remains the same. It is considered by Mr. Bradley as a sort of *planting*, the shoot or scion rather taking root in the stock or tree into which it is grafted, than uniting itself with it, as is shown by its preserving its natural purity and use, although fed and supported by a mere crab stock; which it is conceived depends upon some difference in the vessels of the shoot or scion from those of the stock.

GRAFTING, the art of inserting a shoot taken from one tree into the stem or some other part of another, in such a manner as to unite and constitute a perfect plant of the same kind as that from which the branch was taken.

It is by this practice that particular sorts of curious fruit-trees of different kinds are capable of being raised with a certainty of their being the same, or not degenerating. It has been observed, that though the plants raised from seed are liable to run from their kinds, and afford such fruits as are not worth the trouble of cultivation, those procured from shoots taken from such trees as produce good fruit never alter from their kind, whatever the stock or tree on which they are grafted may be; as, notwithstanding the grafts receive their nourishment from the stocks, their varieties are never altered by them, but continue to produce the same kind of fruit as the tree from which they were taken: the only alteration which they undergo is, that when the stocks on which they are grafted do not grow so fast, and afford a sufficient supply of nourishment to the grafts, they do not make so great a progress as they otherwise would do, nor is the fruit they produce so fair, or sometimes so well flavoured.

This process has the advantage, probably from the supply of nutritious matter being not only more abundant but more regular, of rendering the plants or trees which are thus raised more quick in their arriving at the state of maturity or that of bearing.

It is on these different accounts that the practice of grafting is principally had recourse to in raising different sorts of fruit-trees, as well as some particular sorts of ornamental plants of the tree and flower kinds. It also affords the means of growing different kinds of fruits and flowers of the same sort, on the same stock or tree, as several varieties of pears and apples, &c.

There are several different methods of performing this operation, which are distinguished by different terms.

Rind, shoulder, or crown grafting, is that in which the grafts are set in a sort of circle or crown.

It is chiefly practised on large trees, where either the head or the large branches are cut off horizontally, and two or more shoots or scions put in, according to the size of the branch or stem; in performing which the scions are cut flat on one side, with a shoulder to rest upon the crown of the stock; then the rind of the stock is raised up, to admit them between the wood and the bark of the stock, which must be inserted about two inches, so as that the shoulders may meet, and closely join the crown of the stock; and after the whole of the shoots or scions are inserted, all the crown of the stock should be well clayed over, leaving two eyes of the scions uncovered therewith, which will be sufficient for shooting. It is a method of grafting that was much more in practice formerly than at present, owing to the bad success with which it has been attended; for, as the scions are placed between the rind of the stock and the wood, they are frequently blown out by strong winds after they have made large shoots, sometimes after five or six years' growth. Where this method is practised, there should therefore always be some stakes fixed so as to support the scions until they have almost covered the stock or branch. It is usual to perform the operation in this mode about the beginning of April.

Cleft-, stock-, or slit-grafting, which is practised upon stocks, trees, or branches of a smaller size, as from one to two inches in diameter, and may be used with success where the rind of the stock is not too thick, by which the inner bark of the scion will be prevented from joining to that of the stock. In performing it, the head of the stock or branch must be cut off with a slope, and a slit made the contrary way, in the top of the slope, deep enough to receive the scion, which should be cut sloping like a wedge, so as to fit the slit made in the stock; care being taken to leave that side of the wedge which is to be placed outward much thicker than the other: and in putting the scion into the slit

of the stock, great care must be taken to join the rind of the scion exactly to that of the stock; for, if these do not unite, the grafts will not succeed: when this method of grafting is used to stocks that are not strong, it will be proper to make a ligature of bass, to prevent the slit of the stock from opening; after which the whole should be clayed over, to prevent the air from penetrating the slit, so as to destroy the grafts, only leaving two eyes of the scions above the clay for shooting. It is usually performed about the beginning of March.

Whip- or tongue- grafting is the most generally practised by nursery-men, especially for small stocks, or branches of an inch, half an inch, or less, as the scions much sooner cover the stocks in this method than in the others. It is performed by cutting off the head of the stocks sloping; then making a notch in the slope towards the upper part downward, a little more than half an inch deep, to receive the scion, which must be cut with the slope upward, and a slit made in this slope like a tongue, which tongue must be inserted into the slit made in the slope of the stock, and the scion be placed on one side of the stock, so as that the two rinds of both scion and stock may be equal and join together exactly; after which there should be a ligature of bass put round to fasten the scion, so as that it may not be easily displaced, the whole being afterwards clayed over as in the former methods. It may be performed in the early spring months.

Grafting by approach, inarch-grafting, or abtuction, is performed when the stocks that are designed to be grafted, and the tree from which the graft is to be taken, stand so near together as that their branches may be bent and united. It is commonly practised on tender exotic plants, and some other sorts which do not succeed in any of the other methods. In performing the work, a part of the stock or branch is slit off about two inches in length, a smooth part of the stock being always chosen for the purpose; then a small notch made in this slit of the stock downward, in the same manner as directed for whip-grafting; the branch of the tree designed to be inarched having a part slit off in the same manner as the stock, and a slit made upward in it, so as to leave a tongue, which tongue should be inserted into the slit of the stock, joining their rinds equally, that they may unite well together; after which a ligature of bass should be made so as to keep them exactly in their situation, and afterwards this part of the stock clayed over well, to keep out the air. In this method of grafting, the scion is not separated from the tree

until it is firmly united with the stock, nor is the head of the stock or branch, which is grafted, cut off till the same time, and only half the wood pared off with a slope, about three inches in length, and the same of the scion or graft. In this method of grafting, the operation is not performed so early in the season as the others; it being done in the month of April, when the sap is flowing, at which time the scion and stock will join together, and unite much sooner than at any other season or period of the year. It is principally employed in raising jasmynes, oranges, and other exotic trees of the harder kinds.

It has been found that the walnut, fig, and mulberry will take by this method of grafting, while neither of them succeed in any of the other modes. Several sorts of *method* or grafting likewise be propagated by this method or grafting; but all the trees that are grafted in this way are weaker, and never grow to the size of those which are grafted in the other methods; therefore it is rarely practised, except on such sorts of trees as will not take by the other methods of performing the operation.

Root-grafting, which is a late improved mode, is performed by cutting the clean smooth roots of the stocks in pieces five or six inches long, and as large or a little larger than the graft; then they are whip-grafted, and tied together very close, so as to prevent the wet from affecting the wounded parts, planting them so deep as that the graft, which should be four or five inches long, may be about half buried. In this way the grafts themselves will root, and a nearer similitude be preserved to the tree whence the grafts are taken; and after two or three years the stock may be cut quite away, and the graft left to maintain itself. In practising this method the grafts should be an inch or two longer than in the others.

The period or season for grafting should always be regulated by the state of the weather. From the climate being so uncertain in the spring, it is better to defer it till the circulation of the sap is brisk, and the buds of the stocks begin to break into leaves, attention being had that the weak shoots of tender trees will not admit of being so long cut as the more hardy, and that the operation should never be performed while it actually freezes or rains.

Proper grafts.—In providing these, care should be taken that they are shoots of the former year, as when they are older they never succeed well; that they be always taken from healthy fruitful trees, as, when the trees are sickly from whence they are taken, the grafts often partake so much of the distemper as not

to get the better of it, at least for some years; that they be not taken from young luxuriant trees, whose vessels are generally large, continuing to produce luxuriant shoots, and seldom prove fruitful; and that they be taken from the lateral or horizontal shoots rather than the perpendicular ones. They should be cut off from the trees before their buds begin to swell, which is mostly three weeks or a month before the season for grafting; consequently, when they are cut off they should be laid in the ground with the cut part downwards, burying them half their length, and covering their tops with dry litter, to prevent their drying; if a small joint of the former year's wood be cut off with the scion, it will preserve it the better, and when they are grafted this may be cut off; for at the same time the scions must be cut to a proper length before they are inserted in the stocks; but, till then, the shoots should remain of their full length, as they were taken from the tree, which will better preserve them from shrinking; when the scions are to be carried to a considerable distance, it will be proper to put their ends into a lump of clay, and to wrap them up in moss, which will preserve them fresh for a month or longer; but these should be cut off from the trees earlier than those which are to be grafted near the place where the trees are growing. It is, however, always the best practice to cut the grafts as near the time of their being inserted into the stocks as possible.

Stocks proper for grafting upon.—The stocks are the trees or plants for grafting upon; which are either such old trees as are already growing where they are to remain, but the fruit of which is intended to be changed; or such young trees as have been raised in the nursery as a supply to the garden. In the former case, there is no other choice than that of the branches, which should be such as are young, healthy, well situated, and have a smooth bark. Where these trees are growing against walls or espaliers, it will be proper to graft six, eight, or ten branches, according to the size of the trees, by which they will be much sooner furnished with branches again, than when a less number of shoots or scions are put in; but in standard trees, four, or at most six, scions will be sufficient for the purpose.

In choosing young stocks for grafting upon, such as have been raised from the seed, and that have been once or twice transplanted, should always be fixed upon.

After these, those stocks which have been raised from cuttings or layers should constantly be preferred; but those which are suckers from the roots of other trees should be rejected, as

they are never so well rooted as the others, and constantly put out a great number of suckers from the roots, by which the borders and walks of the garden will be always pestered during the summer season. These, besides being unsightly, take off part of the nourishment from the other trees and plants.

And where these stocks have been allowed a proper distance in the nursery where they have grown, the wood will be better ripened and more compact than those which have grown close, and have been there drawn up to a greater height. The wood of these will be soft, and their vessels large; so that the scions grafted into them will shoot very strong; but they will be less disposed to produce fruit than the others; and when trees acquire a bad habit at first it is difficult to reclaim them afterwards. The stocks most adapted to each sort will be explained under their particular genera, and in considering the nature of stocks. See STOCKS.

Implements proper for the work.—These are principally; a neat small *hand-saw*, for cutting off the heads of large stocks; a good strong *knife*, with a thick back, to make clefts in the stocks; with a sharp *penknife*, or *budding-knife*, to cut the grafts with; and a *grafting chisel* and small *mallet*. Other sorts of instruments are sometimes necessary in performing particular sorts of grafting.

Besides these tools, other sorts of materials are wanted in performing the business, such as *bass-strings*, or *woollen-yarn*, to tie the grafts with; and a quantity of good tough clay, which should be prepared a month before it is wanted, and kept turned and mixed, like mortar, every other day, in the following manner:

A quantity of strong good clay, in proportion to the quantity of trees intended to be grafted, should be provided, and some new well-fed horse-dung broken in among it; and if a little cut straw or hay be mixed amongst it, it will hold together the better. The addition of a quantity of salt will also prevent the clay from dividing in dry weather. These should be well stirred together, putting water to them occasionally, in the manner of making mortar. The whole should be hollowed like a dish, filled with water, and kept every other day stirred. It should be carefully kept from being exposed to frost or drying winds; and the oftener it is wrought over the better.

Some have lately made use of another sort of composition for grafting, which has been found to answer the intention of keeping out the air better than the clayey mixture. It is composed of turpentine, bees-wax, and rosin, melted together; which, when of a proper consistence,

is put on the stock round the graft, in the same manner as the clay is usually applied; and, though it be not above a quarter of an inch thick, it keeps out the air more effectually than the clay; and, as cold hardens it, there is no danger of its being hurt by frost, which is very apt to cause the clay to crack, and fall off; and, when the heat of the summer comes on, it melts and falls off without any trouble. In the using it, a tin or copper pot is necessary, with a convenience under it to keep a very gentle fire with small coal; otherwise the cold soon condenses the mixture. It is necessary not to apply it too hot, lest the graft be injured. A person a little accustomed to this composition applies it very fast; and it is much easier for him to work with than clay, especially when the season proves cold.

In the business of grafting, it is found that in long continued dry seasons the grafts are liable to fail in taking, which is sometimes probably owing to the improper choice of the grafts, as well as to the dry weather. Great care should of course always be taken not to graft with weak shoots, particularly those taken from near the top, but such as are taken from the lower end of the shoots, and in which the wood is plump and fresh; as such as are shrivelled seldom or never take well. Where any have missed in the spring, Mr. Forsyth advises to cut off, about the middle or latter end of June, some fine healthy grafts of the sorts that are wished to graft with, and to open the bark in the same manner as for budding, inserting the graft with a piece of the former year's wood on it; and after this has been done, to rub in with a brush some of the composition in a liquid state; then to wrap bass round it, as is done for spring grafting, leaving about three eyes on the shoot, which should be tied on with the bass as tight as possible; then covering the outside of the bass, thus tied up with the composition to the thickness of about one-eighth of an inch, as well as the end of the shoot, to exclude the air and wet. In about three weeks or a month the grafts should be looked over to see if they have taken. When the graft begins to swell, it will throw off the composition; in which case always remember to apply more, to prevent the air from penetrating the incision or wound.

In the month of September, it should be examined whether the wounds are all healed up, and the two barks perfectly united; which, if they are, slacken the bass; and when they are perfectly healed up, it may be wholly taken off; but if not, the bass must be again tied on, and covered with a composition as before, letting it remain till the following spring. It may then

be taken off; and, if it be found that the two barks have separated during the winter, with the point of a sharp knife all the brown part of the bark (which if left would infallibly bring on the canker) should be cut out, and the composition rubbed into the wound. When the grafts have produced strong leading shoots, the tops of them should be pinched off with the finger and thumb; but if they have not shot strong, they should not be cut till the spring, when they may be cut down to three or four eyes, according to their strength, to make them produce horizontal shoots, and form handsome heads. This sort of grafting should always be performed in moist or cloudy weather, if possible.

Mr. Forsyth says that rubbing a little of this composition into the incision will effectually prevent the canker, and in applying it round the graft a much less quantity is sufficient than of the clay; as it need not be more than three inches round in grafting small stems or shoots, and in proportion for those which are larger. It keeps the scion moist. When used in grafting, it should be of such a consistence as to work easily with the hand, or a knife, or small trowel, rather softer than grafting-clay generally is. This method, on a fair trial, will, he thinks, be found "a sure, neat, and expeditious way of grafting."

In grafting or budding, it should be performed as near to the upper side of a bud as possible, and "the most proper place for inserting the scion or bud is at the joint a little above the cross shoot."

In respect to the sorts of trees that will succeed upon one another, it may be observed, that all such as are of the same genus, that is, which agree in their flower and fruit, take upon each other; hence all the nut-bearing trees may be safely grafted on each other, as well as all the plum-bearing trees, as the several sorts of plums, almond, peach, nectarine, apricot, &c. but as many of them are subject to emit gum from the parts wounded, as the peach and nectarine kinds, it is found the surest method to bud or inoculate them.

All such trees as bear cones also do well upon each other, though they may differ in one being evergreen, and the other shedding its leaves in winter; as in the cedar of Libanus and the larch-tree, which are found to succeed upon each other; but they must be grafted by approach, as they abound with a great quantity of resin, which is apt to evaporate from the graft when separated from the tree before it is joined with the stock; whereby they are often destroyed. The laurel likewise on the cherry, or the cherry

on the Laurel. All the mast-bearing trees are also found to take upon each other, and those which have a tender soft wood do well if grafted in the common way; but such as are of a firm contexture, and are slow growers, must be grafted by approach.

It is likewise by this method that many kinds of exotic trees are not only propagated, but also rendered hardy enough to endure the cold of our climate in the open air; as by being grafted upon stocks of the same sort which are hardy, the grafts are rendered more capable of enduring the cold.

GRAINS OF PARADISE. See **AMOMUM**.

GRASS-GROUND, the parts of ornamented grounds which are kept in the state of short Grass or sward. Those spaces which are extended in the fronts of the houses or habitations, and are termed lawns, are mostly kept in short grass, which by their constant verdure, summer and winter, and open rural appearance, exhibit a fine imitation of nature at all seasons, especially when the side-boundaries terminate in rural plantations in various natural curves and bendings. This mode of laying out pleasure-grounds prevails much at present. But besides these, it is the practice to have rural short Grass openings continued between the plantations throughout the different districts of grounds of this sort, separating and bounding the shrubby clumps, borders, and other parts, in some places widely spreading, in others more contracted; but, in either case, extending to the boundaries of the several plantation compartments, in various bendings, sweeps, and curves; by which the whole is rendered rurally ornamental, and at the same time more agreeable and easy to walk on than gravel between the plantations when the weather is dry and hot during the summer season. In the antient style of gardening, it was much the custom to have straight short Grass-walks, both for ornament and common walking upon: but for ornament, unless elegantly wide and spacious, they have a littleness in their general appearance, as may be seen where long narrow slips of short Grass-Ground are extended to some distance, in the way of walks; and for the latter purpose they are very improper in winter and all moist weather; and even in summer in the mornings and evenings, as being always damp and dewy. Walks of this kind should therefore be but sparingly introduced; and where any are made for variety, ornament, or summer's walking, they should be as spacious as the situation admits, not less than from ten to fifteen feet wide, and even twenty feet wide or more, when the walk is considerably extended in length.

The method of forming short Grass-Ground

work, is either by sowing the parts with Grass seeds, or by laying them with turf, cut from a fine field, common or down; the latter of which, where it can be obtained at a moderate expense, is greatly preferable, as it not only at once forms a complete sward, but is generally more close, even, and smooth, as well as less apt to run up to benty Grass, grow rank, or rise in tufts, than by the sowing method.

In preparing the ground either for sowing Grass seeds upon or laying with turf, the whole must be broken up equally to a moderate spade deep, clearing out all roots of perennial weeds and other coarse materials. When this has been done, stakes or wooden pegs, with notches, for marking the level, according to the position of the ground, must be driven in; then proceed with line and spade to rough-level the ground according to the marks or levels on the pegs, afterwards treading, rolling, or ramming the whole down equally, that it may nowhere sink in hollows afterwards. When this has been finished, the levels should be wrought off more accurately, and the whole finished with a neat raking, clearing off all large stones, and making an even and smooth surface; in this state, it may either be sown with grass seed, or laid with turf.

For the first method, the proper seasons for sowing are either February, March, and April, or in August or September, in moist weather. In moist wet soils the former is probably the best, but in those of a dry gravelly nature, the latter. In this business it is of the utmost consequence to procure good seeds; those from hay-stacks or out of hay-lofts are often used, which may answer well, where the hay was the growth of some fine pasture free from weeds, and naturally afforded fine turf when grazed and mowed; but in other cases, there is often a mixture of various sorts with weeds, by which the sward is rendered irregular and foul, and never makes handsome short Grass-Ground. If you are not furnished with seeds of your own, they may be obtained from the seedsmen, and should be of those kinds which strike deep root, spread out laterally in their tops, are permanent, and capable of resisting the effects of heat; there are many of this kind. The seed must be sown broad-cast, very thick and regular over the surface, and directly raked or harrowed in; and when the surface is dry, it should be rolled with a wooden roller, to bury the seeds more effectually and make a smooth surface; when the grass comes up, all weeds should be removed; and, the same season, when the sward is become thick and green, and advanced some inches in growth, it should be mowed, rolling it well afterwards, and continue mowing it and rolling

two or three times the first summer, especially if it were sown in spring; as the oftener it is mowed and rolled, the thicker and finer it will grow; and, if it be intended to keep the Grass tolerably fine, mowing will be requisite once a week or fortnight, according to the growth, from April till October, and rolling once a week or fortnight, in moderately dry weather; and occasionally in the winter season. In this way a good turf may be formed in a few years.

In the second method, which should always be employed where it can with convenience, the best turf is that of a fine pastured common or down, where the sward is fine and short.

The best season for laying the turf is from September till March or April, though it will grow at almost any time of the year, even, if there be occasion, in summer.

Turf for this use is mostly cut or flayed with an iron instrument called a turving-iron; all the turfs being cut of an equal width, length, and thickness; the proper size is a foot wide, a yard long, and about an inch in thickness. They should be first marked by a line, the proper width, length, and depth, and then cut with a racer or cutter, first longways a foot wide, then across in yard lengths, proceeding afterwards to cut them up; having particular regard to cut them level, all an equal thickness, otherwise it will be impossible to lay them level. As they are cut, they should be rolled each up close and tight, the grass side inwards, and piled up by tens, especially if they are cut by the hundred, which is mostly the case. This is usually done at from about a shilling to fifteen-pence the hundred, according to the nature of the soil, as whether soft and easy to cut, or hard and stony. A man will cut from three to five, six, or seven hundred a day, or more, if very soft easy-cutting turf, with a person to race them out, and roll them up, as they are cut.

The method of laying them is very easy: they are placed regularly turf and turf, unrolling them as they are laid, joining them up quite close edge to edge, and making good all deficiency of broken parts as the work proceeds; and as soon as laid, they should be well beaten with broad heavy wooden beaters, as flat pieces of elm or oak plank, two inches thick, fifteen or eighteen inches long, and a foot broad, having long handles fixed slanting in the middles of the upper side. With these beat the grass regularly all over, and then roll it well with a heavy iron or stone roller, repeating these operations in moist weather.

When very dry hot weather succeeds, so as to occasion the turf to shrink and open at the joints, a good watering is of much advantage.

The management of short Grass-ground after it has been thus laid down, is that of mowing it in summer frequently, to keep it short and fine, like a pastured down; poling occasionally with a long pole, to scatter the worm-casts, which greatly deface all short grass, and rolling it frequently both to take up the scattered worm-casts to make the surface clean, and to render it smooth, firm, and even.

Mowing once a week, ten days, or fortnight, or according to its general growth, during the summer, is necessary, especially for the principal home lawns, and other short Grass-grounds in the most conspicuous parts, which parts should always be kept very close and fine, like the sward of a fine pastured down or common: it is performed with a short grass-scythe; and dewy mornings, or moist weather, must always be chosen for the work, as it will be impossible to mow short Grass properly in dry weather. Previous to mowing, it is of advantage sometimes to pole and roll the grass the day before it is intended to mow: in performing the work of mowing, proper attention is necessary not to score, or leave the marks of the strokes of the scythe, which has a very unsightly appearance; to prevent which as much as possible, the point of the scythe should be laid out rather wide, an inch or two beyond the measure of heel and point, especially for very short grass; keeping the point rather out, and not drawing that part too fast inward, gathering the grass neatly to the left in a range, and after having mowed thus to the end of the swarth, to mow it lightly back again, in order to trim off all scores and other irregularities, unavoidably left the first time in executing the work.

After it has been all thus mown over, proceed to sweep up the mowings of each swarth regularly, by standing in the middle, sweeping it along alternately to the right and left to the end of the swarth, forming all the grass in a range on each side; then sweep up the ranges in large heaps, and carry the whole off directly in a wheel-barrow, large basket, or other contrivance.

The business of poling is performed by a long taper pliable ashen pole, fifteen or eighteen feet long, by passing it backwards and forwards in rather dry weather, so as to break and scatter the worm-casts about. The grass should be afterwards rolled with a wooden roller when the surface is a little moist, but not too wet, by which the earth will all adhere to the roller, and render the surface perfectly clean; the work being repeated, as there may be occasion, the year round; and in mowing-time, if the surface is foul, it is particularly necessary to pole and roll on the day previous to mowing, by which a clean

smooth surface will be provided, so as to be able to mow close, even, and more expeditiously.

In the rolling of short Grass-grounds, it should be performed occasionally with a wooden roller, and a heavy iron or stone roller: the wooden roller is proper after mowing, to clean up the worm-casts and smooth the surface, being performed when the surface is not very wet, especially if full of worm-casts, as it would otherwise plaster and daub the grass, and render it unsightly; the heavy iron or stone roller should be used occasionally, when the surface is dry, to press down all inequalities close, so as to preserve a firm, even, smooth surface. And in fine-kept short Grass-grounds, the rolling should be performed occasionally a day or two before mowing, to settle the surface firm and smooth, which greatly contributes to the easy and exact performance of the work: the business of rolling in small or but moderately large short Grass-grounds is mostly performed by men; but in very extensive grounds, it is sometimes done by a horse; having a large roller for the purpose, with shafts like a cart, and the horse at the time wearing a sort of leather shoes, very broad at bottom, made so as to lace on occasionally like men's half-boots, to prevent his feet cutting the surface in holes, and rendering it uneven.

Where short Grass-grounds are defaced by wild daisies, dandelion, or other weeds, the first may be removed by having the blade of an old broadsword fixed in the end of a long pliable pole, which, as it cuts both ways, by sweeping it backwards and forwards it will head down the daisies at a great pace; which may be repeated two or three times a week, or as often as there may be occasion.

The others should be extirpated by means of an iron for the purpose, made in the form of a small docking-iron.

In the autumn-finishing mowings, the grass should be generally cut down as close and even as possible, that the sward may remain in a neat even surface over the winter season.

These directions for the management of short ornamental Grass-grounds regard only such as are required to be kept constantly short, close, and even in the surface, as is necessary in the principal lawns, plats, walks, and other divisions, situated within the limits of the main pleasure-ground. In the outward considerably extended districts continued into fields, parks, &c. it is not necessary to have them cut so frequently; two or three common mowings in a summer, with occasional rollings afterwards, may be sufficient.

GRAVEL, a small stony substance made use of for the purpose of constructing roads, walks, and paths. Walks formed of this material are great ornaments to gardens and pleasure-

grounds, as well as useful for common walking upon.

The best Gravel for these purposes, is that which is naturally composed of irregular pebbles and flints, having a moderate proportion of a yellowish or brownish sandy loam, to make it bind, and give colour: it is obtained in fields and commons in many parts, at from one to three or four feet under the surface, though not equally good in all parts in respect to quality and colour; some having a greater or lesser proportion of pebbles, a larger or smaller proportion of loam, which is more or less sandy or clayey: it is the colour of the loam principally which constitutes the beauty of Gravel-walks; that of a deepish yellow or reddish colour being the most eligible, as when formed into well-laid walks and rolled, it has an exceedingly beautiful and ornamental effect. Where such Gravel can be procured within a moderate distance, and easy expense, it is preferable to all others; in some parts, Gravel is of an iron-mould colour, or of a dusky-brown hue; which may nevertheless be of a proper quality for walks, where the colour is disregarded.

Whatever colour the Gravel may have, its proper quality for walks is, a due proportion of moderate, light, sandy loam, to make it bind close and firm at all seasons; but not so redundant, or so clayey, as to be clammy and stick to the feet in wet weather, or so sharp and sandy as to become open and loose in dry weather.

In some places, no other Gravel is met with but such as is very loose, sandy, or pebbly, and which has scarcely any binding materials amongst it; which kind never of itself binds, but always remains open and loose, being at all times disagreeable to walk on: this, therefore, must be mended by a mixture of light sandy loam, where practicable, adding about one load to every two or three of Gravel, casting them together, and turning them over two or three times, that they may be well blended and incorporated; and this, when formed into a walk, will often bind close, firm, and smooth at all seasons.

In preparing the Gravel for walks, it should not by any means be finely screened, as is often the practice: as it is dug out of the pit, it is only necessary to cast it up in a heap, or long ridge, all such large rough pebbles only as roll down being cleared away; as if screened from the stones, it partakes too much of the loam, so as always to stick to the feet at every flash of rain.

In purchasing Gravel for walks, it is mostly from about two to five or six shillings or more per cartload for three horses; though the price differs greatly in different parts, and according to the nature of the Gravel.

In respect to the distribution of Gravel walks in pleasure-grounds and gardens, for ornament or use, large ones are necessary to proceed immediately parallel to the house, extending each way towards the side districts of the garden and ornamented grounds; according to the former style of gardening, a large walk of this kind was usually extended in a straight line from the front of the habitation along the middle of the pleasure-ground, sometimes having grass plats continued on each side, and sometimes spacious borders furnished with curious shrubs and flowers. But in modern designs these middle walks are rarely admitted, especially in spacious grounds, having nothing in front beyond the parallel habitation-walk, but an open rural grass lawn, free from all intersections of walks, &c. However, a good walk closely parallel to the house is indispensably necessary, both for ornament and convenience; and from this, side-walks should branch off, communicating with the other parts of the pleasure- or garden-grounds; one in particular to be extended in a serpentine manner quite round the ground, others leading in the same manner through the interior parts, so as to have dry firm walking at all times to every part of the ground or garden without coming upon the grass.

The dimensions for Gravel-walks, must be regulated according to the extent of the grounds or gardens, as from five to twenty feet or more in width; but all principal walks should be at least eight or ten feet wide; and in large grounds or gardens, leading directly from the house, they should be ten, fifteen, or twenty feet wide at least. Where the houses and gardens are very large, the main walks contiguous to the mansion are sometimes made thirty or forty feet wide; the boundaries on each side being sometimes in grass widely extended, and sometimes in borders for flowers and other curious plants, having either narrow verges of grass, or edgings of dwarf-box, or thrift, on the sides of the walks.

In forming walks of this sort, they should be first staked out to the proper width, and then the boundaries formed, each side of equal level, corresponding to the adjacent ground; the cavity of the walk for the reception of the Gravel being afterwards made, the whole space being dug out ten or twelve inches deep, to allow for a proper depth of Gravel, both to prevent weeds rising from the ground below, and worms from casting up the earth; as also to allow of a proper depth for turning the Gravel occasionally when the surface becomes foul: the earth dug out to form the cavity of the walk, may be used to raise and form the ground on each side, if necessary, which, and the edgings, should always

be completed before the Gravel is begun to be laid.

When the cavity has been thus prepared, any hard rubbishy materials may be laid in the bottom, several inches thick; such as coarse Gravel or ballast, rough stony lime, brick, or other rubbish, which will greatly prevent worm-casts, and help to drain the moisture from the top of the walk in wet weather, and in winter preserve a dry surface: the proper Gravel is then to be laid six or eight inches thick; in laying, raising the middle higher than the sides, in a gradual rounding form; which is not only necessary to throw off the wet, but also to give the walk a more ornamental appearance; the proportion to be observed in this is, for a walk of five or six feet width, an inch and a half of rise in the middle; for one of ten or twelve feet, two and a half inches; and for one of twenty feet, from three to four or five inches; the same proportion being regarded in other widths. At every ten or fifteen feet, as the work advances in laying, it is proper to tread, rake, and roll the Gravel down, as it always rolls more firm and smooth whilst fresh stirred; it is also necessary, for fear of rain, especially in loamy Gravel; for which reasons more should never be laid in one day than can be finished off, except the rough laying. The treading should be performed regularly with the feet pretty close, taking short steps; so as to render every part equally firm, and not to sink in holes under the feet, in the work of raking and rolling. The raking should be performed regularly lengthways of the walk; and in the finishing off or smooth-raking, a wooden-headed rake without teeth is most eligible, or the back of any common rake; as by either of these the surface may be rendered more regular and even without drawing off the requisite proportion of top pebbles, or raking them into holes or heaps; as the art of smooth-raking is to leave all the proper-sized top stones equally dispersed over the surface. As soon as any part is thus laid and raked, it should be well rolled, both across and lengthways; and when the whole is laid, a good rolling should be given the whole length, repeating it till the surface is rendered perfectly compact, firm, and smooth; and after the first shower of rain, another good rolling should be given, so as to make it bind like a rock. This method should be practised in all walks made with this material.

The management afterwards is, occasional weeding, sweeping, and good rolling once or twice a week, especially in the advanced part of spring, and all summer; and also occasionally in winter, in dry open weather; and when the surfaces become very foul, or overrun with

small weeds or moss, as is often the case, they must be broken up in spring, and turned, the surface to the bottom, and the bottom to the top, by which the weeds and moss will not only be buried, but the walks appear as fresh as when new laid. The custom of breaking up Gravel-walks in the beginning of winter, and laying them up in rough ridges, to destroy weeds and moss, is not eligible for general practice, or only occasionally, where any walk is exceedingly over-run; it is mostly more advisable to permit all the principal Gravel-walks to remain undisturbed, at least till the spring, when, if it appear necessary, the whole may be broken up, regularly turned, and re-laid in a neat manner.

The turning of Gravel is a sort of slight digging, the foul surface being turned down and the fresh up; some have it performed regularly once a year in the early spring, in order to preserve the colour. In these cases, the laying, raking, and rolling are performed the same as in the first constructing the walks.

The rolling should be performed once a week at least, in summer, but if two or three times, the more beautiful the walks will appear, and it will tend greatly to destroy weeds and moss: it is mostly a rule among gardeners, to sweep and roll every Saturday. During the summer it is of much advantage to give a good rolling after rain, which preserves a compact smooth surface.

GREEN-HOUSE, a sort of building fronted and covered with glazed frames, destined for the purpose of preserving various sorts of exotic plants through the winter season: the aid of artificial heat is not here necessary, except in very intense cold weather. It is advisable, in constructing such houses, to erect flues to use occasionally, which may prove serviceable, not only in severe frosts, but also in moist foggy weather, when a moderate fire now and then will dry up the damps, which would otherwise prove pernicious to many of the tender kinds of plants.

It differs from the conservatory chiefly in this circumstance, that the plants, trees, or shrubs are in pots or tubs, and placed upon stands, frames, or stages, during the winter, to be removed to proper situations in the open air in the hot summer season; while in that there are beds, borders, and clumps laid out in the ground plan, and made up with the best earthy materials to the depth of three or four feet, in which the shrubs, trees, &c. are regularly planted; the whole of the roof being removed during the summer to admit fresh air, and replaced on the approach of the autumn, to remain till the following summer.

Green-Houses are at present mostly contrived to stand in the pleasure-ground, near to the house if possible. They should be upon a somewhat elevated and dry spot, full to the south, and where the sun has access from its rising to its setting: the buildings are commonly of brick or stone, having the fronts and tops almost wholly of glass-work; and ranging lengthways east and west. They are generally constructed upon some ornamental plan. As to the general dimensions in respect to length, width, and height, they may be from ten to fifty feet or more in length, according to the number of plants to be contained; and in width, from ten or fifteen to twenty feet; but for middling houses, fifteen or eighteen feet is a sufficient width; and in height in the clear, nearly in proportion to the width.

The walls on the backs and ends, particularly the former, should be carried up two bricks thick; and if more than fifteen feet high, two bricks and a half thick; at one end of the back wall, on the outside, it is eligible to erect a furnace, for burning fires occasionally, communicating with flues within, ranging in two or three returns along the back wall, having one flue running along the front and end walls, raised wholly above the floor.

The fronts of the buildings should have as much glass as possible, and wide glass doors should be made in the middles, both for ornament and entrance, and for moving in and out the plants. It would also be convenient to have a smaller entrance door at one end: the width of the windows for the glass sashes may be five or six feet; and the piers between the sashes may be either of timber, six, eight, or ten inches wide, according to their height, or, if of brick or stone-work, two feet wide at least, sloping both sides of each pier inward, that by taking off the angles, a freer admission may be given to the rays of the sun: for the same reason the bottoms of the sashes should reach within a foot of the floor of the house, and their tops almost as high as the roof; and if brick or stone piers two feet wide, shutters may be hung on the inside to fall back against each pier: the roof may be either wholly or half glass-work, next the front; the other half slated, especially if the upright or front piers are of timber; and shutters to cover the top glasses may be contrived so as to slide under the slated roof: where the piers are of brick or stone, it is common to have the roof entirely slated or tiled; but slating is the most ornamental, either for a half or whole roof; and the ceiling within should be lathed, which, as well as the whole inside wall, must be well plastered and white-washed.

In Green-Houses of modern construction, in order to have as much glass as possible in front, the piers between the sashes are commonly of timber only, from six to eight or ten inches thick, according to the height, so as to admit as great a portion of light and heat of the sun as possible, and the roofs wholly of glazed frame-work.

Green-Houses for large collections of plants have sometimes two wings, of smaller dimensions, added to the main building, one at each end, in a right line, separated sometimes from it by a glass partition, with sliding sashes for communication, and the front almost wholly glass-work, and half or whole glass roofs. Thus by these additional wings, the houses consist of three divisions, whereby the different qualities and temperatures of the various plants can be more eligibly suited. The middle or main division may be for all the principal and more hardy, woody, or shrubby kinds, which require protection only from frost; one of the wings appropriated to the succulent tribe; and the other to the more tender kinds that require occasional heat in winter, but which can live without the heat of a stove.

On whatever plans Green-Houses are constructed, the whole of the inside walls should be neatly finished off with plaster and white-wash, and the wood-work painted white; the bottom being paved with large square paving tiles, or some other similar material.

In the Green-House there should be stands, frames, or tressels, which may be moved in and out, upon which rows of planks may be fixed, so as to place the pots or tubs of plants in regular rows one above another; by which their heads may be so situated, as not to interfere with each other. The lowest row of plants next the windows being placed about four feet from them, that there may be a convenient breadth left to walk in front; and the rows of plants should rise gradually from the first, in such a manner that the heads of the second row be entirely advanced above the first, the stems only being hid; and at the back of the house a space allowed of at least five feet, for the convenience of watering the plants, and to admit a current of air round them, that the damps occasioned by their perspiration may be the better dissipated; which by being pent in too closely often occasion a mouldiness upon the tender shoots and leaves, and when the house is close shut up, this stagnating rancid vapour is often very destructive; for which reason they should never be crowded too close to each other, nor should succulent plants ever be placed among them.

In the annexed plate is the plan and elevation of an improved Green-House, in which fig. 1. is the front elevation, fig. 2. the ground plan, fig. 3. a section.

GREEN-HOUSE PLANTS, such as require the protection of this sort of building during the winter or other season: the following are the principal of the different sorts that require this sort of management.

SUCCULENT KIND.

Agave, *Agave* or *American Aloe*, comprising Common great American Agave, with entire green leaves, and a branching flower-stalk.—Common Agave, with striped leaves.—Virginia Agave, with narrower pale-green leaves.

Aloe, *African Aloe*, containing Mitre-shaped Aloe—Tree, or Sword Aloe—Aloe Ferox—Fan Aloe—Succotorine Aloe—Soap Aloe—Partridge-breast Aloe—Tongue Aloe—Warted-Tongue Aloe—Pearl-Tongue Aloe—Cobweb Aloe—Hedge-hog Aloe—Cushion Aloe—Spiral Aloe—Pentangular Spiral Aloe—Triangular Spiral Aloe—*Iris Uvaria* Aloe.

Anthericum, *Spider-wort*, containing Shrubby-stalked, Onion-leaved Anthericum—Aloe-leaved Anthericum—Mock Asphodel Anthericum.

Cacalia, *Foreign Colts-Foot*, comprising Cacalia Ficoides—Kleinia, or Indian Cacalia—Anteuphorbium Cacalia—Papillary Cacalia.

Cactus, *Melon Thistle*, containing Cactus Opuntia, or Common Indian Fig.

Cotyledon, *Navel-wort*, containing Round-leaved—Long-leaved—Hemispherical-leaved.

Crassula, *Lesser Orpine*, containing several species.

Euphorbia, *Euphorbium*, containing most of the sorts.

Mesembryanthemum, *Fig Marigold*, containing many curious species.

Sempervivum, *Live Ever*, or *House-Leek*, containing Tree House-Leek—Variegated Tree House-Leek—Lesser Canary-Tree House-Leek.

HERBACEOUS KIND.

Antholyza, *Ethiopian Corn-Flag*, containing Ringent Scarlet Antholyza—Ethiopian Crimson Antholyza—Cunonia, or Large Spathed Scarlet-Flowered.

Antirrhinum, *Snap-Dragon*, containing Variegated Snap-Dragon—Gibraltar Spotted-Flowered Linaria—Dalmatian Toad-Flax.

Aristolochia, *Birth-wort*, containing Evergreen Aristolochia—Pistolochia, or Small Birth-wort.

Bryonia, *Bryony*, containing African Tuberous-rooted Bryony.

Calla, *Calla*, containing Sweet Calla, or Ethiopian Arum.

Campanula, *Bell-flower*, containing American Bell-flower.

Canarina, *Canarina*, containing Canary Bell-flower.

Canna, *Indian flowering Reed*, containing Common Indian flowering Reed, and varieties—Glaucous Indian Reed.

Crinum, *Asphodel Lily*, containing African Asphodel Lily—Broad-leaved Asphodel Lily.

Cyclamen, *Cyclamen*, containing Persian Cyclamen, and several varieties.

Erodium, *Erodium*, containing Pentandrous Geranium, or Crane's-Bill—Thick-leaved Erodium—Upright—Dwarf Erodium.

Erythrina, *Coral-Tree*, containing Herbaceous Erythrina.

Ixia, *Ixia*, containing African Woolly-headed Ixia—Bulbiferous Ixia—Flexuous Ixia—Corymbose spotted-flowered Ixia.

Leonurus, *Lion's Tail*, containing African Scarlet Leonurus—Striped-leaved Leonurus.

Ornithogalum, *Star of Bethlehem*, containing Cape Ornithogalum.

Tropæolum, *Indian Cress*, containing Double Indian Cress, or Nasturtium.

SHRUBBY KIND.

Andromeda, *Andromeda*, containing Tree Andromeda, or Carolina Sorrel.

Anthospermum, *Amber-tree*, containing Ethiopian Smooth Amber-tree—Ciliated Amber-tree.

Anthyllis, *Jupiter's Beard*, or *Barba Jovis*—Common Barba Jovis, or Silver Bush—Spanish ternate-leaved Barba Jovis—Dwarf Portugal Barba Jovis—Erinacea, or Prickly Anthyllis.

Arctotis, *Arctotis*, containing Rough-leaved Arctotis—Narrow-leaved Arctotis—Sea Ragwort-leaved Arctotis—Plantain-leaved Arctotis.

Artemisia, *Mug-wort*, containing Tree-Wormwood.

Asclepias, *Swallow-wort*, containing Shrub Asclepias.

Asparagus, comprising White Prickly Asparagus—Declinated Bristly-leaved Asparagus—Acute-leaved Asparagus—Retrofracted Great Prickly Asparagus.

Aster, *Star-wort*, containing Shrubby African Aster.

Astragalus, *Milk-vetch*, &c. comprising the Tragacanth, or Goat's-thorn, and several varieties.

Atropa, *Deadly Night-shade*, containing Shrubby Deadly Night-shade of Spain.

Baccharis, *Plumghman's Spikenard*, containing Ivy leaved Baccharis—Oleander-leaved Baccharis—Halimus-leaved Baccharis.

Bosea, *Yerva-moru*, or Shrubby Golden-red Tree.

Brunia, containing Knot-flowered, or Imbricated-leaved—Woolly, heath-leaved—Abrotanoides, or Thyme-leaved—Radiated Brunia.

Bubon, *Macedonian Parsley*, containing Shrubby Galbaniferous Bubon—Shrubby Gum-miferous Bubon.

Buddleia, comprising American long-spiked—Occidental American—Globular-headed Buddleia.

Bupthalmum, *Ox-eye*, containing Shrubby Jamaica Ox-eye—Maritime, or Sea Ox-eye.

Bupleurum, *Hare's-ear*, containing Shrubby Ethiopian Hare's-ear—Shrubby Difforme-leaved Cape Hare's-ear.

Calendula, *Marigold*, containing Shrubby Cape Marigold—Shrubby Grass-leaved Ethiopian Marigold.

Capparis, *Caper Bush*, containing Spinous Capparis, or True Caper Shrub.

Cassine, *Cassine*, containing Cape Phillyrea—Maurocenia, or Hottentot Cherry.

Ceanothus, *Ceanothus*, containing African Ceanothus.

Celastrus, *Staff-tree*, containing Pyracantha-leaved Celastrus—Box-leaved—Myrtle-leaved Celastrus.

Ceratonia, *Carob-tree*, comprising Common Carob-tree, or St. John's Bread.

Chamærops, *Chamærops*, containing Dwarf Palm.

Chrysanthemum, containing Shrubby Canary Chrysanthemum—Shrubby Floscular Chrysanthemum.

Chrysocoma, *Goldy-locks*, containing Shrubby Coma Aurea, or Greater African Goldy-locks—Shrubby Nodding Goldy-locks.

Cistus, containing Bay-leaved Cistus—Sea-Purslane-leaved Cistus; and several other species.

Citrus, *Citron-tree*, containing Lemon-tree, and Orange, with all the varieties of each.

Cliffortia, *Cliffortia*, containing Ilex-leaved Cliffortia.

Cluytia, *Alaternoides Cluytia*, containing Purslane-leaved Cluytia—Elateria, or Indian Cluytia.

Colutea, *Colutea*, containing Shrubby Ethiopian Scarlet Colutea.

Convolvulus, *Convolvulus*, comprising Evergreen Canary Convolvulus—Silvery Convolvulus.

Coronilla, containing Valentine Coronilla—Glaucous Coronilla—Silvery Coronilla.

Dais, *Dais*, containing Cotinus-leaved Dais.

Digitalis, *Fox-glove*, containing Shrubby Canary Fox-glove.

Diosma, *African Spiræa*, containing Opposite-leaved—Hairy-leaved—Red Diosma, &c.

Ehenu, *Ebony*, containing Ebony of Crete.
Genista, *Broom*, containing Shrubby Canary Broom.

Geranium, *Geranium*, containing all the shrubby kinds.

Gordonia, *Gordonia*, containing Loblolly Bay.

Gorteria, *Gorteria*, containing Shrubby prickly-leaved *Gorteria*.

Grewia, *Grewia*, containing Occidental *Grewia*.

Halleria, *Halleria*, containing African-fly Honeysuckle.

Heliotropium, *Turn-sole*, containing Shrubby Peruvian *Heliotropium*.

Hermannia, *Hermannia*, containing *Althæa*-leaved—Alder-leaved—Lavender-leaved—Gooseberry-leaved *Hermannia*.

Hypericum, *St. John's Wort*, containing Warty-leaved Minorca *St. John's Wort*—Carolina *St. John's Wort*—China Monogynous *St. John's Wort*.

Jasminum, *Jasmine*, containing Catalonian *Jasmine*—Azorian *Jasmine*—Yellow Indian *Jasmine*.

Iberis, *Candy-tuft*,—Evergreen Tree Candy-tuft, Evergreen Striped-leaved Candy-tuft—Everflowering Tree Candy-tuft.

Justicia, *Malabar Nut-tree*.

Lantana, *American Viburnum*, containing African *Lantana*, or *Ilex*-leaved *Jasmine*—Sage-leaved *Lantana*.

Laurus, *Bay-tree*, containing Carolina Blue-berried Bay—Red-berried Bay-tree—Indian Bay-tree—Cinnamon-tree—Camphire-tree—Deciduous Bay-tree.

Lobelia, *Lobelia*, containing Shrubby, Pine-leaved, Blue *Lobelia*.

Lycium, *Box-thorn*, containing African Box-thorn—Barbary Box-thorn.

Malva, *Mallow*, containing African Shrub Mallow.

Medicago, *Medicago*, containing Shrubby Hoary *Medicago*, or Moon Trefoil.

Melia, *Melia*, containing Bead-tree.

Mentha, *Mint*, containing Tree-Mint.

Morea, *Morea*, containing Canaliculated-leaved *Morea*—Rush-leaved *Morea*.

Myrica, *Gale*, *Sweet Willow*, and *Candleberry Myrtle*, containing Oak-leaved *Myrica*—*Æthiopian Heart-leaved Myrica*.

Myrtus, *Myrtle-tree*, containing Common *Myrtle*, which comprehends many varieties.

Nerium, *Oleander*, or *Rose-bay*, comprising Common *Oleander*, with red flowers, scarlet flowers, white flowers, double flowers, striped leaved.

Olea, *Olive-tree*, containing European *Olive-tree*—Cape, or African *Olive-tree*.

Ononis, *Rest Harrow*, Shrubby Spanish *Ononis*.

Osteospermum, *Osteospermum*, containing hard-seeded *Chrysanthemum*.

Othonna, *Ragwort*, containing Pectinated-leaved *Othonna*—Southernwood-leaved *Othonna*.

Passerina, *Sparrow-wort*,—Shrubby African *Passerina*.

Pelargonium, *African Geranium*, containing many shrubby species.

Phlomis, *Jerusalem Sage*, containing Yellow *Phlomis*, and varieties—Purple *Phlomis*.

Physalis, *Physalis*, containing *Alkekengi*, or Winter Cherry—Somniferous Winter Cherry—Flexuous Winter Cherry.

Pistacia, *Pistachia Nut*, and *Mastic-tree*, two or three varieties.

Polygala, *Milk-wort*, containing Shrubby Myrtle-leaved *Polygala*.

Portulaca, *Purslane*, containing Shrubby Cape Purslane-tree.

Poterium, *Burnet*, containing Shrubby Prickly Burnet.

Prasium, *Shrubby Hedge Nettle*.

Protea, *Silver-tree*, containing Common Silvery *Protea*, or Changing-tree—Coniferous *Protea*.

Punica, *Pomegranate-tree*, containing Dwarf Pomegranate.

Rhus, *Sumach*, containing African Hoary Sumach, and varieties—African Narrow-leaved Sumach, and varieties—Shining-leaved African Sumach.

Royena, *Royena*, containing African Bladder-nut.

Rumex, *Dock*, containing Sorrel-tree.

Ruscus, *Knee-holly*, containing Alexandrian Laurel—Tongue-upon-tongue Laurel.

Salvia, *Sage*, containing Shrubby African Golden-flowered Sage—Shrubby African Blue-flowered Sage—Canary Sage—Mexican Sage, or Shrubby Mexican Clary.

Scabiosa, *Scabious*, containing Shrubby Scabious.

Senecio, *Groundsel*, containing Shrubby African Groundsel.

Sideritis, *Iron-wort*, containing Canary Iron-wort—Cretan Iron-wort.

Solanum, *Night-shade*, containing *Amomum Plinii*, Bastard Capsicum, or Winter Cherry—African Jagged-leaved *Solanum*, or *Pomum Amoris*—American Twin-fruited *Solanum*—Thorny, Downy Night-shade.

Tanacetum, *Tansey*, containing Shrubby

Æthiopian Tansey—Under-shrubby *Samphire-leaved Tansey*—Tree *Tansey*.

Tarchonanthus, *Tarchonanthus*, containing *Shrubby African Fleabane*.

Tetragonia, *Tetragonia*, containing *Shrubby Tetragonia*.

Teucrium, *Germander*, comprising *Spanish Tree-Germander*—*Broad-leaved Tree-Germander*.

Vitex, *Chaste-tree*, containing *Evergreen Chaste-tree*.

Ulex, *Furze*, or *Whins*, containing *African Berry-bearing Furze*.

Xeranthemum, *Xeranthemum*, containing *Broad-leaved Xeranthemum*—*Narrow-leaved Xeranthemum*—*Trailing Xeranthemum*.

Yucca, *Adam's Needle*, containing *Common Adam's Needle*—*Thready-leaved Adam's Needle*—*Aloe-leaved Yucca*—*Dragon Tree-leaved Yucca*.

Zygophyllum, *Bean Caper*, containing *Sessile-leaved Bean Caper*—*Purslane-leaved Bean Caper*.

UNDER-SHRUBBY KIND.

Dracocephalum, *Dracocephalum*, containing *Canary Dracocephalum*, or *Balm of Gilead*.

Gnaphalium, *Gnaphalium*, containing *Oriental Gnaphalium* and varieties—*Sweet-scented Gnaphalium*.

Inula, *Inula*.

Keggelaria, *Keggelaria*, containing *African Keggelaria*.

Lavateria, *Lavateria*, containing *Cape Lavateria*.

Lavendula, *Lavender*, containing *Cut-leaved Canary Lavender*.

Lotus, *Bird's-foot Trefoil*, containing *Cretan Silvery Lotus*—*Lotus Jacobæus*—*Upright Lotus*.

Mediola, *Mediola*, containing *Climbing African Mediola*.

Origanum, *Origany*, containing *Dittany of Crete*—*Dittany of Mount Sipylus*—*Cretan Marjoram*—*Origany of Smyrna*.

Periploca, *Virginian Silk*, containing *African Hoary Climbing Periploca*, and varieties.

Phylica, *Bastard Alaternus*, containing *Box-leaved Phylica*—*Heath-leaved Phylica*.

Phyllis, *Bastard Hare's-ear*, or *Simpla nobla*.

Polium, or *Mountain Poly*, containing *Marum*, or *Syrian Mastich*.

Rhamnus, *Buckthorn*, containing *Broad-leaved Indian Rhamnus*—*Zizyphus*, or *Jujube*.

Selago, *Selago*, containing *Corymb Selago*.

Smilax, *Rough Bindweed*, containing *Chinese Rough Bindweed*, or *China-Root*—*Laurel-leaved Rough Bindweed*, and several varieties of each.

Stœbe, *Stœbe*, containing *Bastard Elichrysum*.

These sorts of plants must constantly be kept in pots, or some large sorts in tubs, for moving into shelter in winter, and into the open air in summer; as, being all exotics from various warm parts of the world, they are of tender growth in this climate, and consequently not able to live in the open air in the winter.

The pots and tubs for containing them must be of different sizes, according to the size and nature of the plants, which, as they advance in growth, should have larger pots, &c. accordingly; and when they become too large for the pots, they must be shifted into tubs hooped with iron, with two iron handles to each at top.

And in potting or planting the different sorts, care should be taken that the pots or tubs have holes at bottom for the discharge of redundant moisture; each hole being covered with a piece of tile or oyster-shell before the mould is put in, to prevent their being stopped up, and the earth from being washed out.

The modes of propagating the different sorts, the nature of the earth in which they succeed best, and the season of raising them, are fully explained under the culture of the respective kinds.

General Management of Green-House Plants.

As most plants of this sort are capable of bearing the open air from the latter end of May till October; but the rest of the year demand the protection of the green-house, they of course require to be set out as soon as the weather begins to be suitable, in the spring and summer months; especially for such as all the varieties of Myrtles, Geraniums, Oleanders, Cistuses, Phlomis, Shrubby Aster, Tree-Wormwood, Tree-Candy-tuft, Yellow Indian and Spanish Jasmines, Indian Bay, &c. And this should be done in the last week in May or first in June, according as the season proves more or less favourable for all the other sorts: but it should not be attempted until the season is become perfectly settled, and there is a fair prospect of summer being arrived, as there are often very cold nights, and frequently frosty mornings, in May, and even in the beginning of June, which, if the plants were fully exposed, would pinch the ends of their young shoots and leaves, and greatly injure them. A mild warm day should be chosen for this work; and if a warm rain, it will be of much advantage, as it washes the leaves and branches from the dust they have contracted, and greatly refreshes the plants.

Setting out the Plants.—This is done in the more hardy sorts in their pots, about the middle of May.

When first brought out, it is proper to place them in some sheltered sunny place, for a fortnight, till they are inured to the open air; then to set them in any open exposure, where they

are to remain for the summer. And as soon as they are brought out, they should be cleared from all dead leaves, and all dead wood; and the earth on the surface of the pots be stirred, taking a little of the old out, and adding some fresh mould in its stead, which will prove very beneficial; then give a moderate watering, not only to the mould, but also all over the heads of the plants, to clean them effectually from all dirt and filth which they may have contracted in the green-house.

They may be placed according to the fancy of the proprietor; some of the handsomest plants being occasionally placed to adorn spacious fore-courts, or arranged on each side of large walks contiguous to the main habitation; and others near ornamental garden-buildings; they are also sometimes disposed in groups or small clumps in the most conspicuous places, in different parts of the pleasure-ground; exhibiting different sorts in each group, to cause the greater variety and effect.

When thus placed out, their chief culture is, to supply them plentifully with water during that season in hot dry weather: all the woody or shrubby kinds in particular, likewise the herbaceous kinds that are not very succulent, require it three times a week at least; and in a very hot dry time, once every day. The succulent kinds must also have a moderate supply of water two or three times a week in dry weather; the proper time for watering all the sorts at this season is, either in a morning before nine o'clock, or in the afternoon about four or five; for, if performed in the middle of the day in summer weather, the sun would exhale a great part of the moisture before it effected its intended operation on the fibres of the plants: this business should be duly attended to in dry weather. As the mould, roots, and fibres of the plants are circumscribed within the narrow limits of a pot or tub, the earth, as well as the fibres, dries very fast in summer, and necessarily requires frequent refreshments of water, to preserve that due and constant degree of moisture which is requisite for the support of healthy vegetation.

Moderate rains should not prevent watering occasionally, especially such plants as have spreading heads, which prevents the rains, unless very heavy or constant, from falling in sufficient quantities on the earth of the pots, to moisten it properly. And in hot weather, if some mowings of short grass are spread on the surface of the Orange-tree tubs, and others, it will greatly preserve the moisture. During this season, it will also be a good practice to loosen the surface of the earth now and then, in such pots and tubs as have a tendency to bind or become stiff.

Taking in the Plants.—In the beginning of the autumn, as towards the latter end of September, the more tender kinds of these exotic plants must be removed into the house; the succulent tribe, in particular, should be removed to shelter at the first approach of excessive wet, and cold nights. The oranges, lemons, and all the other species, should be moved into shelter in due time, either in the end of September or early in October; for, if they are permitted to remain in the open air till attacked by sharp weather, it changes the beautiful verdure of their leaves to a rusty yellow hue, which they do not recover during winter: therefore, about the latter end of September, or beginning of October at latest, the principal plants should be brought in: the succulent, and others of the more tender temperature, as early in the former month as the cold weather begins to come on; and continue moving in all the others as the cold increases; and by the middle of October, have the whole collection in. As the time approaches for moving in the different sorts, clear them perfectly well from decayed leaves, &c. all the pots being well cleaned, and loosen the surface of the earth in each pot, adding a little fresh mould. As the different sorts are brought occasionally into the green-house, they may be placed promiscuously, till the whole are in, and then be arranged regularly, as they are to remain for the winter; leaving all the windows quite open till that time. When the whole is brought in, they should be disposed in regular order, so as to appear to the best advantage, both in respect to their general arrangement and variety, and so as each may have an equal portion of sun and air: the tallest plants being arranged in the back, the others in their several ranks, according to their degrees of height, gradually down to the lowest in front; and as there is a vast variety, both in size, shape, and colour of the foliage, they should be so disposed as to set off each other, and give a pleasing variety to the whole; and, if possible, they should stand clear of one another; by which each plant will be separately conspicuous, and the whole exhibit a greater air of freedom and variety, as well as admit an equal portion of sun, and a more free circulation of air.

After the plants have been thus collected in, their principal culture is, the supplying them with fresh air at all opportunities in mild weather, and giving moderate waterings occasionally, picking off decayed leaves, cutting out casual decayed shoots, and making occasional moderate fires in severe weather, also sometimes to dispel great damps and noxious fogs.

In respect to giving air, it should be admitted every mild, calm day, by opening the windows more or less, according to the temperature of the

weather. When the plants are first housed, they should have as much free air as the nature of the season will admit, by opening the windows every mild day to their full extent; and if the air is quite temperate, they may remain open on nights for the first week; but in cold nights they should be constantly shut: this work of admitting air must be constantly attended to all winter; for, without a due portion of this essential article in mild weather, the plants soon lose their fine verdure, and assume a sickly yellowish colour, become diseased, and the young shoots, in many sorts, grow mouldy and rot off, and the leaves of the plants drop; therefore, never omit, every mild day, when not very damp or foggy, to open some or all of the windows, little or much, according as the air is more or less temperate: the proper time during winter, for this, is from about eight, nine, or ten in a morning, till three, four, or five in the evening, according to the mildness of the day: but as the days lengthen, and the warm weather increases, give more air in proportion, earlier and later in the day, as may be judged proper, being careful always to shut all close in due time every evening, as soon as the sharp air approaches. In foggy weather it is advisable to keep the windows quite close; for the great damps occasioned by fogs are very pernicious to these plants whilst they are confined in the house: also, when boisterous or cold cutting winds blow towards the front of the Green-house, the whole should be kept shut; or only, if thought necessary, some of the upper sashes drawn down a little way at top, above the reach of the wind rushing immediately upon the plants: likewise, in all frosty weather, the house should be kept close, except the frost is moderate, and the middle of the day sunny and warm, when some of the windows may be opened a little, but shut close again if the sun is clouded, and at any rate before the air changes cold: in severe weather, the shutters, &c. should be shut every night, also occasionally on days when the frost is extremely rigorous, and no sun: and likewise, in such weather, the assistance of fire-heat, as hereafter directed may be necessary. As the spring approaches, and the weather grows warmer, enlarge the portion of air accordingly, admitting it also both earlier in a morning and later in the evening as the days lengthen; for then the plants will begin to assume a growing state, and a considerable portion of air is requisite every mild day, both to strengthen the new shoots and inure the plants by degrees to the air, against the time for removing them into it fully again for the summer season.

Watering will also be necessary to most of the sorts, but must be afforded them as sparingly as possible during the winter months, and scarcely any should be given when the house is obliged to be shut close through the severity of the weather: there are no certain rules to be given for the application of this; some plants require only a little water once a week, or ten or twelve days in mild weather, such as the orange- and lemon-trees, myrtles, oleanders, shrubby-geraniums, and other woody kinds; all that is necessary being just to preserve the earth very moderately moist; the pots and tubs must therefore be examined with proper attention, and water given to such only as are in want. The herbaceous kinds should be rather more sparingly watered than the shrubby sorts; and all the succulent tribe have water but seldom, some not oftener than once a fortnight or three weeks, and that always but very sparingly at each time; and some that are very succulent require but very little from November till March: indeed all the succulents should only have it now and then at this season, when the earth in the pots becomes very dry.

In performing the watering in general, be particularly careful to do it with great moderation whilst the plants are in the green-house; as, if you once over-wet the earth at this season, it will remain so for a long time, and, by chilling the tender fibres of the roots, often prove the loss of the leaves of many of the plants, and even the death of some sorts. On a sunny day, from about eleven to two o'clock, is the proper time for performing this business.

Soft water, if possible, should be used, or at least such as has been exposed to the air two or three days.

During frosty weather great attention is requisite to keep all the windows close, night and day, unless when very moderate, as just observed, and the middle of the day is sunny and warm; when some part of the house may be opened a little for two or three hours, having particular regard to shutting all close in due time in the afternoon, before the air changes to become sharply cold; and in very severe frosts it must be kept close night and day; and the shutters, or other covers of canvass or mats, be also used every night; also occasionally in the day-time, when the weather is intensely severe, and no sun appears, and there are no fires for fires to keep out the frost. The shutters or other shelters, besides the glasses, should however be used as little as possible in the day-time, except in cases of particular necessity, as every opportunity ought to be taken for the admission of light and fresh air, as much as the tempera-

ture of the weather will possibly admit, as most of the plants only want protection from frost and the common shelter of the house, which with shutting the sashes close every night will be sufficient.

Where there are flues for fires, it will be advisable to make moderate ones at such times as the frost cannot be otherwise kept out, especially on nights; but this must by no means be continued longer than is necessary to guard against very severe frosts.

In very cold, foggy, damp weather, a moderate fire now and then in the flues also proves very beneficial in expelling the damp unwholesome vapours, so pernicious to all plants of this nature.

Whilst the plants are in the house, all decayed leaves, &c. should be constantly picked off, being necessary both to preserve the beauty and health of the plants. The decayed leaves of the succulent kinds should be cut off close with a sharp knife; the plants in general should likewise be occasionally cleaned from any filth they may contract in the house, such as dust, cobwebs, &c.

General Culture of the Plants.—This sort of plants generally want shifting into larger pots and fresh earth as they advance in growth; such as are fast growers, as some of the shrubby geraniums, &c. annually, or every other year; and some plants in large pots, &c. once in two or three years, and others not so often, especially some large grown American aloes, orange- and lemon- trees, and those in large tubs, having a considerable substance of earth about the roots. Sometimes these and other similar kinds, when not convenient to shift them, have the top earth, and a little down round the sides, loosened to some moderate depth in the spring, removing the loosened soil, and filling the space up with fresh compost. But as the plants in general increase considerably in proportion to their nature of growth, shifting into larger pots or tubs, with some fresh earth, should not be omitted occasionally as it may seem necessary, as it proves beneficial to most of the sorts. They may most of them be shifted with the ball of earth about their roots entire; but others, that are rather weak and sickly, require shifting into entire fresh earth.

The most proper time for shifting all the sorts is in April, or before they are removed into the open air for the summer; but it may be occasionally done in autumn, as in August, or the beginning of September, in time to strike fresh root before winter. In the work of shifting, each plant should be drawn out of its pot or tub with the ball of earth about its roots entire, then

all the dry matted fibres round the outside of the ball pared off and cleared away, also some of the old earth at the sides, bottoms, and tops: then having the new pots and fresh earth ready, the holes at the bottoms of the pots should be covered with pieces of tiles or oyster-shells, and some of the fresh earth put in; placing the plant in the pot, and filling up the vacancy all around with more fresh compost, bringing it an inch over the top of the ball, giving a good watering, to settle the earth close in every part: after this it is necessary to place the plants to have shade from the mid-day sun for a week or fortnight.

Such plants as are become of a weak sickly nature should, at shifting, have all the earth taken clean from about their roots, having them washed, and then planted into entire fresh earth.

The larger sorts of plants, such as the orange-trees, lemons, citrons, American aloes, and others of similar growth, should be shifted, when large, from pots into tubs hooped with iron, having two iron handles at top for the convenience of lifting them in and out of the green-house, as they sometimes grow to so large a size as to require two, and sometimes three or four, men to move them.

All such plants as are not shifted annually should, in spring, have the earth in the tops of the pots or tubs loosened to a little depth, also a little way down round the sides, taking the loosened earth out; and in its stead adding a quantity of fresh mould, giving it directly a little water to settle it close. This should never be omitted.

At any time when the surface of the earth is observed to be stiff, whether in the shifted or unshifted plants, it is of much service to stir it an inch in depth occasionally, and add a little fresh compost when necessary.

The mould or compost into which the plants are to be shifted is of considerable importance. The best is obtained from commons where sheep and cattle pasture, particularly in low places, where the finest grass grows, and the soil is deepest. A foot of the top soil with the turf should be taken off, and if a sandy or hazel loam it will do alone; but if a strong loam, some sand and black peaty or moorish soil should be added. Such soils should be laid in a heap six winter months or more, and frequently turned over. Some plants, as aloes, mesembryanthemums, ixias, and exotic liliaceous plants in general, require a soil which is a degree lighter, and which does not retain the water, but lets it pass readily. A little coal-ashes at the bottom of each pot is useful in this view.

Most of the ericas, or heaths, and other beautiful plants from the Cape of Good Hope, from America and Botany Bay, delight and flourish in that sort of earth which comes nearest to their native soil: thus, the heaths like a black peat or moorish soil; and the others, that which is made a degree stronger with loamy earth.

Keep the heads and every part clean from dust and other filth, by occasionally washing with water in all the sorts, which in most is done by waterings over their heads; but in others, when very foul, by washing their leaves with a sponge and water, especially in winter. This is often necessary to the oranges and lemons, and other large-leaved kinds of plants.

When the heads of any of the shrubby kinds are become very irregular or shabby, the branches may be pruned, shorter or longer as necessary, in the early spring.

And where any of the principal exotics assume a declining state, such as oranges, lemons, &c. or have thin, straggling, weakly heads, or are apt to drop their leaves, it is proper either to shift them wholly, or apply some fresh earth to their roots, and then prune the heads moderately close in the early spring, plunging them in a bark-pit under glasses. The heat of the bark-bed so greatly revives their growth, that they break forth into many strong new shoots, and form handsome renewed full heads in the summer.

While in the green-house, some plants drop all their leaves, either by the effects of cold, or over-watering, or sometimes by being kept long in too dry a state, as frequently occurs in myrtles and geraniums, and sometimes oranges, lemons, and others; in which case, it is proper in the spring to prune the heads, shortening the long strong shoots and branches, and to shift them with balls into fresh earth, or, if not shifted, to loosen the earth in the tops and sides of the pots, drawing out the loosened mould, and supplying the place with fresh. They afterwards soon push forth into young shoots and leaves, and renew their heads with verdure. Sometimes myrtles, geraniums, &c. in this state, when headed, may, on being brought forth in the summer, be drawn out of the pots, and plunged in the ground in a sheltered situation, and watered in dry weather; when they will send their roots into the full earth, and break forth strongly at top into young wood and foliage, and form full heads, being then re-potted with balls of earth to the roots.

The heads of green-house plants should never be clipped with garden-shears, nor, by any mode of pruning, trimmed into any

formal figure, as sometimes practised; but every sort be let assume its own natural growth, only just using the knife to regulate any very irregular or rambling shoot or branch, or to thin out some where too much crowded, and to cut out the dead wood they may contain.

GREWIA, a genus containing plants of the tender shrubby kind for the green-house.

It belongs to the class and order *Gynandria Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a five-leaved perianthium: leaflets lanceolate, upright, leathery, coloured within, spreading, deciduous: the corolla has five petals, the same form with the calyx, often smaller, emarginate at the base: the nectary a scale inserted into each petal at the base, thickish, bent in, inclined to a rim surrounding the style: the stamina have very numerous filaments, the length of the petals, bristle-shaped, inserted into the base of the germ: anthers roundish: the pistillum is a pedicelled germ, roundish, sitting on a columnar, upright receptacle, surrounded by a five-cornered rim: style filiform, the length of the stamens: stigma obtuse, four-cleft: the pericarpium is four-lobed, four-celled: the seeds solitary, globular, and one-celled.

The species cultivated are: 1. *G. occidentalis*, Elm-leaved Grewia; 2. *G. orientalis*, Oriental Grewia.

The first grows to the height of ten or twelve feet, and has a stem and branches very like those of the small-leaved elm, the bark being smooth, and of the same colour as that of elm when young: the leaves are also very like those of the elm, and fall off in winter: the flowers are produced singly along the young branches from the axils, and are of a bright purple colour; they appear towards the end of July, and continue through August to the beginning of September, but are never succeeded by fruit in this climate.

The second species, in its native situation, is a tree of a middling size: the leaves serrate, petioled: peduncles from the axils, tomentose, trifid, three-flowered: berry sub-globular, depressed, becoming obtusely four-cornered in drying, succulent; the skin, when fresh, saffron-coloured, villose; flesh pulpy, fugacious; stones hard, like grape-stones, having a deep furrow on the back, two-celled. It is a native of the East Indies, flowering in July and August.

Culture.—These plants are capable of being increased by cuttings or layers.

In the first method the cuttings should be made in the early spring, and planted in pots

filled with earth of the light soft loamy kind, being plunged in a bark hot-bed, and well shaded and watered. When they have taken root, they should be gradually inured to the full air, in order to be placed in a warm situation in it till the autumn, when they must be protected in the green-house.

The layers may be laid down in the early spring, and when they have stricken good root be taken off, and planted out in separate pots in the same manner as the cuttings, and afterwards managed in the same way.

The proper periods of removing these plants are the early spring and autumn.

They require little water in the winter season; but in the summer frequent waterings are necessary, as two or three in the course of the week.

They afford ornament and variety among other potted plants.

GROVE, a sort of avenue formed by trees of stately growth, disposed in rows, in grass-grounds, gardens, and parks, on or contiguous to spacious lawns, &c. designed for ornament, shade, and shelter. These sorts of walks are much less in estimation at present than formerly.

In extensive gardens or grounds they may be formed in different parts; a large one contiguous to the dwelling, where it may be conspicuous, is often proper, both to effect ornament, and that it may afford convenient shade for occasional walking in the heat of summer; others may be stationed more remote, on the boundaries of lawns or other open spaces of grass-ground, and near garden buildings, such as summer-houses, temples, and other structures; as, wherever they are situated, they always exhibit an air of grandeur, and are great ornaments to spacious gardens. Such gardens are indeed incomplete without one or more of such plantations.

The trees in forming groves are usually disposed in several straight rows, and at such distances as their branches may so far approach each other, as to afford a moderate shade from the summer's sun; yet so distant, that each tree may have full scope to spread its branches all around, so as to exhibit their straight trunks and spreading heads distinct, according to their natural growth, and that a due portion of air and light may be admitted to promote the growth of the grass between and under them, so as to form a close, firm sward, and constant verdure. They are also sometimes formed with the trees placed irregularly, and the spaces between planted with various sorts of shrubs to form un-

derwood, and with serpentine gravel-walks variously winding through the whole. The trees and shrubs that are most proper for this use, are those of the deciduous and evergreen tall-growing kinds, which form handsome heads.

They are distinguished into two sorts, *open groves* and *close groves*.

For the first sort, the handsomest growing ornamental forest-trees with the most spreading heads should be chosen, and disposed in ranges from fifteen to twenty or thirty feet wide, and the same distance between the trees in each row, that each tree may have full scope to form a spreading head, and so as to admit of the growth of grass under them without injury. Where a shady grove is required to be formed as soon as possible, it may be planted contiguous, but distinct from the above, arranging the rows only at ten or fifteen feet distance; by which it will afford shade several years sooner than the other; and, as exhibiting a more dark and gloomy shade, will afford the greater variety in contrast with it. Open groves, chiefly for shade, may also be formed by disposing all the trees irregularly, that they may produce an imitation of a natural grove, and sooner afford a perfect shade and gloominess, which they effect considerably sooner than in straight rows.

The latter sort of groves are formed of large trees, some planted in straight lines, others irregularly disposed, having the ground between them filled with various under-shrubs, and gravel or sand-walks continued through them in winding or serpentine turns; and are sometimes continued round the out-boundaries of pleasure-grounds, parks, &c. as ornamental plantations, and to afford shady and private walking, as well as shelter from the inclemency of cold cutting winds. The various shrubs forming the underwood have a delightful effect in the whole of the walks quite round.

In forming groves in general, it sometimes happens, when gardens or pleasure-grounds are laid out, that large old trees are found growing in a proper situation to constitute a grove, which, if they do not too greatly approach to the habitation, or obstruct any principal prospect or distant view, should be preserved with care; and although they should stand ever so irregularly or close, they may be somewhat regulated by grubbing up the most irregular and ill-formed, or thinning out some, where they form too close a thicket for the design, either for an open or close grove. By proper care in this respect a grove may often be formed in a very short space of time.

GROUNDSEL-TREE. See BACCHARIS.

GUAIAECUM, a genus comprising plants of the exotic tree kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Gruinales*.

The characters are: that the calyx is a five-leaved perianthium: leaflets ovate-oblong, concave, obtuse, spreading, deciduous: the two outer ones a little smaller: the corolla has five petals, roundish-obovate, obtuse, concave, spreading, longer than the calyx, ending in short claws, inserted into the receptacle: the stamina have subulate filaments, broader at the base, upright, shorter than the corolla, inserted into the receptacle: anthers oblong, finally recurved: the pistillum is a germ, broader above, angular, pedicelled: style short, subulate: stigma simple, acute: the pericarpium has from two to five capsules (five-celled), on very short pedicels, compressed, membranaceous, covered with a pulpy rind, gibbous on the outside, united on the inside, separating when ripe, gaping: the seeds solitary, bony, and oblong.

The species cultivated are: 1. *G. officinale*, Official Guaiacum, or Lignum Vitæ; 2. *G. sanctum*, St. Juan American Lignum Vitæ; 3. *G. Afrum*, African Acute-leaved Guaiacum.

The first, in its native situation, becomes a very large tree, covered with a hard, brittle, brownish bark, not very thick: the wood is firm, solid, and ponderous, appearing very resinous, of a blackish yellow colour within, and of a hot aromatic taste: the smaller branches have an ash-coloured bark. Browne describes it as an evergreen, of a dark gloomy cast, continuing its verdure in the driest seasons, and at times throwing out a great number of blue flowers, which are succeeded by compressed berries of a roundish form. It takes many years to arrive at its full growth.

It is the tree that affords the gum guaiacum, which is obtained by jagging the body of the tree in May. It exudes copiously from the wounds, though gradually; and when a quantity is found accumulated, hardened by exposure to the air and sun, it is gathered, and packed in small kegs. It is a native of the West Indies.

In the second species there are many leaflets placed along the midrib by pairs; they are rounded and obtuse at their ends, but narrow at their base, of the same consistence with those of the first sort, but of a darker green colour. The flowers are produced in loose bunches towards the ends of the branches, of a fine blue colour, and the petals fringed on their edges.

It is sometimes called in the West Indies Bastard Lignum Vitæ.

The third has rigid branches: the leaves are alternate, with eight pairs of leaflets: common petiole edged, jointed, channelled; leaflets ovate-oblong, opposite, quite entire, mucronate, smooth, stiffish, perennial, very slightly shortened at the inner base: the stipules pressed close to the branches, subulate, very small. It is a native of the Cape.

Culture.—These plants are capable of being increased by sowing the seeds obtained from their native situations, in pots filled with light earth, plunging them in the hot-bed. When the plants have acquired some growth, they should be carefully removed into other pots, and be well shaded till they have taken fresh root; when they should have a large portion of free air admitted, and be frequently watered when the season is hot and dry, but little in the winter. They must constantly in the winter have the protection of the hot-house, though the third sort will often succeed in a good greenhouse.

They are propagated with difficulty by layers. They afford variety in collections of the stove and green-house kinds.

GUILANDINA, a genus containing plants of the tree and shrubby exotic kinds.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leaved perianthium (urceolate or pitcher-shaped): tube short, turbinate, permanent, with an oblique mouth: border five-parted, nearly equal, spreading, deciduous: divisions oblong, broader on the outside, and rounded: the two upper ones a little shorter, the lowest a little longer: the corolla has five petals, inserted into the neck of the calyx: the uppermost roundish, concave, ascending, a little shorter; the rest oblong, broader in front, rounded at the tip, reflex-spreading, longer than the calyx, and the two lowest a little longer than the middle ones: the stamina have subulate filaments, thicker at the base, and villose, decumbent, inserted into the neck of the calyx, shorter than the corolla, unequal: the lower ones gradually longer: anthers oblong, affixed to the back: the pistillum is an oblong germ: style filiform, length of the stamens; stigma simple: the pericarpium is a rhomboidal legume, the upper suture convex, from swelling compressed, one-celled, with transverse partitions: the seeds bony, globular-compressed, solitary between the partitions.

The species cultivated are: 1. *G. Bonduc*, Yellow Bonduc, or Nicker-tree; 2. *G. Bondu-*

cella, Gray Bonduc; 3. *G. Moringa*, Smooth Bonduc; 4. *G. dioica*, Hardy Bonduc.

The first has leaves near a foot and half long, composed of six or seven pairs of pinnæ, each of which has as many pairs of leaflets, which are ovate and entire; the principal midrib of the leaf is armed with short, crooked, single thorns, placed irregularly: the stalks are also armed with thorns, which are larger. The stalks at first grow erect, but afterwards twine about the neighbouring trees and shrubs. The flowers are in long axillary spikes, and of a yellow colour. It is a native of both Indies.

The second species differs from the first in having much smaller leaves, set closer together; and below each pair of leaflets two short stiff crooked spines, which are opposite: the flowers are of a deeper yellow, and the seeds are ash-coloured. It makes a good fence, and is a native of the Indies, &c.

The third is a tree, which has a thick root of a softer substance than usual. Trunk of a middling size, from twelve to twenty feet in height, smooth, with an ash-coloured bark: the branches are rather erect: the leaves bipinnate: common petioles two or three feet long, round, smooth, stiff; the partial ones in five or six pairs, horizontal, compressed: leaflets in three pairs, ternate, oblong, entire, smooth, veined: the flowers in racemes, which are long, axillary, round, pubescent, subdivided, many-flowered; the subdivisions branched, directed one way, bent down; under these are minute deciduous scales. They are of a white or pale red colour. It is a native of the East Indies.

The fourth species has an erect stem, thirty feet high or more, dividing into many branches, covered with a very smooth, blueish, ash-coloured bark: the leaflets are oval, very smooth, and entire, alternate. There are male and female flowers on different plants. It is a native of Canada.

Culture.—The three first sorts are increased by sowing the seeds, which in the two first must be previously well soaked in water, in pots filled with light fresh mould, and plunged in the tan hot-bed. When they have attained a little growth, they should be removed into separate pots, and replaced in the tan-bed, due shade being given. They afterwards require the care of tender exotics, being pretty freely watered in hot weather during the summer; but very sparingly in winter. The third sort must however be very sparingly watered at all times.

The fourth species may be raised by planting the cuttings, or making layers in the spring season. It succeeds best in a light dry soil.

The former are proper for affording variety

among tender stove plants; but the last is so hardy as to succeed in the open ground, in the fore parts of beds, clumps, and borders, in warm dry situations.

GUINEA PEPPER. See CAPSICUM.

GUM, a vegetable disease incident to fruit-trees of the stone kind, distinguished by a morbid exudation of gummy matter from the wounded alburnum, or inner bark. It is supposed by Mr. Forsyth to arise from injudicious pruning, from bruises, or any injuries received in the wood or bark, which may happen from strokes of the hammer in nailing, from pinching the shoots by nailing the shreds too tight, or by driving the nails too close to the branches. And it may be occasioned by leaving the foot-stalks of the fruit, or by pruning in summer, and cutting the shoots to short stumps, and by injuries sustained by a careless application of ladders in nailing and gathering the fruit, &c. but it originates more particularly where large limbs have been lopped or broken off. It may be known before the gum itself makes its appearance, by the bark at first becoming of a brownish colour, and gradually growing darker, till at last the gum begins to ooze out like little blisters. As soon as any of these marks are met with, the infected part should be cut out with a sharp instrument, and the composition and powder applied immediately. In doing this, the gum should be cut out perfectly clean. It may be seen oozing out from between the wood and bark, and must be followed till the white clean bark and wood is arrived at. And afterwards, if any gum should make its appearance, it must be scraped off; which is best done when it is moistened with rain, as it can then be scraped off easily without hurting the bark. This business must be performed without delay; otherwise the disease will advance with rapidity, and greatly injure the trees.

Mr. Forsyth recommends, that when trees are hollow they should be examined carefully, to see whether any grubs have entered the bark and wood, which is known by their perforating the bark; and that where there are any, they should be carefully cut out before the composition is applied to the tree.

It has been suggested by the author of the "Philosophy of Gardening," that this exudation may perhaps be prevented from continuing to flow, by binding on the part, previously smoothed by a knife, thin sheet lead, such as tea is wrapped in, in such a manner as to prevent the gum from being dissolved by rain or dew, as its hardening prevents the exudation, and the consequent exhaustion of the tree. A piece of sponge, soft leather, or Indian rub-

ber should be bound on under it till the part is healed. A strong solution of green vitriol in water is likewise supposed capable of being useful, by being applied to the extremities of the exsuding vessels, and thus stimulating them into contraction, and by that means preventing the further discharge of this substance.

The nice application of a piece of fresh bark taken from a similar tree of inferior value, kept on by the elastic pressure of a list bandage, is also suggested as worthy of being made a trial of in the same intention.

H Æ M

HÆMANTHUS, a genus containing plants of the bulbous-rooted herbaceous flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx is a six-leaved involucre, very large, bearing an umbelule: leaflets erect, oblong, permanent: the corolla is monopetalous, erect, six-patted: parts erect, linear: tube very short, and angular: the stamina have six subulate filaments, inserted into the tube, and longer than the corolla: the anthers incumbent, oblong: the pistillum is an inferior germ: the style simple, length of the stamens: the stigma simple: the pericarpium is a roundish three-celled berry: the seeds solitary, and three-cornered.

The species cultivated are: 1. *H. coccineus*, Scarlet Hæmanthus, or Blood-flower, or Lily; 2. *H. punicens*, Waved-leaved Hæmanthus, Blood-flower, or Bastard Dragon; 3. *H. carinatus*, Carinated Cape Hæmanthus.

The first has a large bulbous root, from which in autumn come out two broad flat leaves, of a fleshy consistence, shaped like a tongue, which turn backward on each side, and, spreading flat on the ground, have a singular appearance all the winter; but in the spring they decay. The flowers are produced in autumn, just before the new leaves come out; and are of a bright red colour, in a large cluster, two or three inches from the bulb. It is a native of the Cape.

In the second species the roots are composed of many thick fleshy tubers, forming a head, out of which arises a fleshy spotted stalk, spreading at top into several spear-shaped leaves,

H Æ M

which are waved on their edges. The stalks are a foot high; leaves six or eight inches long, and two broad in the middle. - From the side of the stalk near the ground breaks out a strong fleshy scape, six or eight inches long, with a large cluster of yellowish red flowers at top. The berry is obovate, of a fleshy scarlet colour. It is a native of Africa.

The third has a large bulbous root, sending out three or four leaves, a foot long or more, not flat, but hollowed like the keel of a boat, and more erect than those of the first sort, but not quite so broad: the flowers are of a paler red. It is a native of the Cape.

Culture.—The first and third sorts are raised with difficulty, as off-sets are only sparingly afforded. The off-sets, when procured, should be planted in pots of light loamy mould, as soon as the stems decay, placing them in a dry glass case. When thus taken up, the old roots may remain out of the ground till August, and be then new potted, and placed out till they require protection for the winter.

The second sort is increased by parting the roots, and planting them in pots of light loamy earth in the early spring, before they put forth new stems. This is also the period for re-potting the old roots.

They are likewise all capable of being raised from seeds, especially the second sort, by sowing them in pots of light sandy earth, and plunging them in the bark stove. When the plants are up, they should have air admitted pretty freely; when of some growth being removed into separate pots, and replunged in the hot-bed. When hardened properly, they may be placed in the dry stove.

These plants require the management of other

bulbous-rooted plants, little water being given in the winter season, but pretty frequently in warm weather, and when flowering, with also a pretty free allowance of air.

They are all very ornamental in stove collections.

HÆMATOXYLUM, a genus containing a plant of the exotic tree kind for the stove.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leaved perianthium, coloured: tube very short, pitcher-shaped, fleshy, permanent: border five-parted, spreading, deciduous: parts oblong, blunt; the four upper ones equal, the lowest a little longer than the rest: the corolla has five lanceolate petals, broadest at top, blunt, veined, spreading, nearly equal, inserted into the calyx, and larger than its divisions: the stamina have ten subulate filaments, hairy at bottom on the inside, upright, unequal, scarcely longer than the corolla, inserted into the calyx: anthers oval, small: the pistillum is an oblong sabre-shaped, compressed germ: style capillary, bent at the tip, longer than the stamens: stigma funnel-shaped: the pericarpium is a lanceolate legume, flat, blunt, one-celled, edged on each side with a thickish suture that does not open, opening by the bursting of the valves in the middle longitudinally, and dividing into two unequal boat-shaped parts: the seeds few, oblong, compressed, furrowed, and fixed to one of the sutures.

The only species is *H. Campechianum*, Log-wood, Blood-wood, or Campeche-wood.

In its native situation it rises from sixteen to twenty-four feet high. The stem is generally crooked, and seldom thicker than a man's thigh: the inner bark is red, and the wood hard: the branches are subdivided, flexuose, prickly, round, ash-coloured: the leaves pinnate: petioles alternate, patulous, round, smooth; leaflets four pairs, on very short petiolules, generally obcordate, entire, small, veined, very smooth and shining, spreading in the day time, but at night upright, converging: the flowers are peduncled, numerous, small, pale yellow; on short, scattered, simple, coloured peduncles. It is a native of Campeche, flowering in March and April.

Culture.—This plant is increased, by sowing the seeds procured from its native situation, in pots filled with light earth, plunging them in the bark-bed in the stove. When of a few inches growth, they should be removed into separate pots, and be replunged into the hot-bed. By this means they grow rapidly the first year.

They are, however, very tender, requiring the constant protection of the stove, and daily watering.

These plants afford variety in mixture with others of the stove kind.

HALESIA, a genus containing plants of the hardy deciduous flowering shrubby kinds, Carolina Snow-drop Tree.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leaved perianthium, very small superior, four-toothed, permanent: the corolla monopetalous, bell-shaped, ventricose; mouth four-lobed, blunt, patulous: the stamina have twelve filaments (seldom sixteen) subulate, upright, a little shorter than the corolla: anthers oblong, blunt, upright: the pistillum is an oblong, inferior germ: style filiform, longer than the corolla: stigma simple: the pericarpium is a corticated nut, oblong, narrowing to both ends, four-cornered, the corners membranaceous, two-celled (drupe four-celled): the seeds solitary.

The species are: 1. *H. tetraptera*, Four-winged Halesia, or Snow-drop Tree; 2. *H. diptera*, Two-winged Halesia.

The first frequently comes up with two or three stems, from fifteen to twenty feet high, sending out branches towards their tops: the leaves are serrate, sharp-pointed, with the middle depressed, growing alternately on short foot-stalks: the flowers hang in small bunches all along the branches, each germ producing from four to eight or nine; they are of a pure snowy whiteness; and as they blow early in the spring, before the leaves appear, and continue for two or three weeks, make a most elegant appearance: they are succeeded by pretty large four-winged fruit, hanging likewise in bunches, and agreeable to the taste. It is a native of South Carolina; flowering in April and May.

In the second species, the leaves are six times the size of the foregoing, not at all tomentose underneath: the fruit mucronate, with two large wings opposite to each other, and two minute ones. It is a native of Georgia.

Culture.—These plants are capable of being raised by seeds and layers. In the first method, the seed should be sown in pots of light earth, placing them in a situation to have the morning sun, or, what is better, in a mild hot-bed. When the plants are up, which is often long in effecting, they should have air pretty freely admitted in order to harden them, but be sparingly watered. They should afterwards be occasionally protected from bad weather, and, when of sufficient hardy growth, be turned out of the pots, and removed into the situations where they are to remain.

The layers of the young shoots may be laid

down either in the autumn or spring, slitting the part laid into the earth. When well rooted in the following autumn, they may be taken off and planted out in the nursery, to remain till of two or three feet growth, when they may be planted out where they are to remain.

These plants are adapted to the borders and clumps of shrubberies and pleasure-grounds.

HALLERIA, a genus containing a plant of the shrubby evergreen kind for the green-house.

It belongs to the class and order *Didymia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved perianthium, trifid, flat, spreading, very obtuse, permanent: the upper cleft twice as broad as the rest: the corolla is monopetalous, ringent: tube roundish at the base, bent in with a swelling throat: border oblique, upright, four-cleft; the upper cleft a little longer than the others, blunt, emarginate; the side ones shorter, broader, sharper; the lowest very short, very slender, and very sharp: the stamina have four filaments, bristle-shaped, straight, inserted into the tube, longer than the corolla: anthers roundish, twin: the pistillum is an inferior, ovate germ, ending in a style longer than the stamens: stigma simple: the pericarpium is a roundish berry, two-celled: the seeds small, flat, roundish, and winged.

The only species is *H. lucida*, African Fly-Honeysuckle.

It grows to the height of six or eight feet with a woody stem well furnished with branches: the leaves are ovate, serrate, opposite, and continuing green through the year; the flowers come out singly, and are of a red colour; but being intermixed with the leaves, and growing scattering on the branches, are not easily discerned. They come out in June, and the seeds ripen in September. The leaves continue green all the winter. It is native of the Cape; flowering from June to August.

Culture.—This plant may be propagated by cuttings, which should be planted in pots filled with light earth in the summer.

When the plants are up, they may be exposed in the summer, and have plenty of water; and in winter be housed with Myrtles, and other hardy exotic plants, which require much air in mild weather.

They may also be raised by sowing the seeds in pots of light earth, and plunged in the hot-bed, by which means they succeed very well.

They afford variety in green-house collections.

HAMAMELIS, a genus containing a plant of the hardy deciduous shrubby kind.

It belongs to the class and order *Tetrandria*

Digynia, and ranks in the natural order of *Berberides*.

The characters are: that the calyx is a three-leaved involucre, three-flowered: the two inner leaflets roundish, smaller, blunt; the outmost larger, lanceolate: perianthium double: the outer two-leaved, smaller, roundish; the inner four-leaved, upright; the leaflets oblong, blunt, equal: the corolla has four petals, linear, equal, very long, blunt, reflex; nectary of four truncate leaflets, growing to the corolla: the stamina have four filaments, linear, shorter than the calyx: anthers two-horned, bent in: the pistillum is an ovate germ, villose, ending in two styles, which are of the same length with the stamens: stigmas capitate: there is no pericarpium: the seed is an ovate nut, half covered with the calyx, blunt, furrowed on both sides at the tip, having two little horns spreading horizontally, two-celled, two-valved.

The only species is *H. virginica*, Witch-Hazel.

It has a woody stem, from two to three feet high, sending out many slender branches: the leaves are oval, indented on their edges, having great resemblance to those of the Hazel, and placed alternately on the branches: these fall away in autumn, and then the flowers come out in clusters from the joints. It is a native of Virginia.

Culture.—This plant is propagated by seed, and layers made from the young branches.

In the first method, the seed procured from America is sown in an easterly border, half an inch deep; the plants come up the second spring, the ground being kept clean from weeds: when the season proves very dry, moderate waterings should also be given in summer; and when they are two years old, they should be transplanted into nursery rows.

The layers should be laid down in autumn, or early in spring, the young twigs of the last summer's shoots being chosen; giving them a slit at a joint, then laying them in the earth. They will be rooted, and fit to transplant into the nursery by the autumn following. When they have had some growth there, they may be removed to the places where they are to remain.

They afford variety in the shrubbery and other parts of pleasure grounds.

HAND-GLASSES, such glasses as are moved by the hand, and used for placing over, protecting, and forwarding various sorts of plants. In winter, such as young cauliflowers, lettuces, &c. and in raising seedling plants of both these in the spring, as well as several others, in hot-beds, or in warm borders; also small sallading. And they are particularly necessary in the culture of general crops of summer cucumbers, for pla-

cing upon the hot-bed ridges made in April and May, and also occasionally for melon-ridges made in the same season to produce a crop of autumnal fruit. In the flower-garden, pleasure-ground, nursery, green-house, &c. they also prove very useful in propagating, raising, and protecting many kinds of curious plants in their young growth.

They may also be employed in raising many of the tenderer or more curious annual flowers, such as African and French marygolds, chrysanthemums, balsams, ten-weeks stocks, and others of similar kinds, where better contrivances are not at hand. See ANNUAL PLANTS.

They are likewise useful in striking many sorts of small cuttings, pipings, and slips of tender or curious plants, such as myrtles, flowering plants, and other similar kinds.

Hand-glasses are of different kinds and forms. The leaded glasses consist of many small panes of glass worked into lead-work.

They are mostly made square, but sometimes round or octagonal; in all of which, each is formed in an open frame-work of strong window-lead, and sometimes of cast-iron in the same form; but more commonly lead; the lower part being upright, from six to eight or ten inches in depth, and the other hipped off or sloped on each side, narrowing upward, so as to terminate in a point, as it were, at top, having in that part a fixed erect ring handle of the same material; the glass being laid in lead-work, and the joints well brushed over with proper cement, to render the whole wind and water tight.

They are of different dimensions, from twelve or eighteen inches to two feet wide, or more, to suit different purposes; though for general use in kitchen gardens, about eighteen inches width is the most common, and nearly the same in depth in the whole; but some for particular uses are of smaller sizes, as from six or eight to ten or twelve inches width.

When laid in frames of cast-iron, in putty, they are neat, strong, and durable; but heavy, and much more expensive than leaded glasses.

The bell Hand-Glasses are blown at the glass-houses in different places, and are equally eligible, or superior to the leaded glasses in many cases, especially in kitchen-gardens, particularly for the preservation of plants in winter, such as early crops of cauliflowers to stand the winter, lettuces, &c. as well as for hot-bed ridges of cucumbers and melons, in the summer and autumn crops.

These are in dimensions nearly in proportion to that of the larger sizes of leaded glasses, or rather wider below; made in the bell form, having a rough knob at top serving as a handle; they should be made not too high, but flat and

dome-form above, which is more advantageous in promoting a strong growth, and not so liable to draw up the plants, while they receive the benefit of the sun more effectually.

The leaded glasses are superior in this respect, that when any of the glass-work is broken it can be readily mended or replaced by the glazier; but the bell glasses, when much broken, are nearly useless; though, when they are broken into pieces, they may be joined with a cement of strong white lead, and placed under cover till it is thoroughly dry; and then, with care in handling, they may last a long time. As new bell-glasses are more liable to crack by frost, or too hasty moving them, than older ones seasoned to the weather, in using them the first winter in crops of early cauliflowers, &c. great care should be taken in handling them, in lifting them off and on, or raising one side occasionally for the admission of air: the seasoned old sound glasses are in this respect more valuable than the new ones.

The leaded glasses should have wooden frames at the bottom part to rest upon, otherwise they are soon destroyed by their constant contact with the earth.

HARD-BEAM TREE. See *CARPINUS*.

HARE-BELLS. See *HYACINTHUS*.

HARE'S-EAR. See *BUPLEURUM*.

HAWTHORN. See *CRATÆGUS*.

HAZEL-NUT-TREE. See *CORYLUS*.

HEATH. See *ERICA*.

HEART'S EASE. See *VIOLA*.

HEDERA, a genus containing plants of the shrubby, climbing, evergreen, and deciduous kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Hederaceæ*.

The characters are: that the calyx is an involucre of a simple umbel, very small, many-toothed: perianthium very small, five-toothed, surrounding the germ: the corolla has five petals, oblong, spreading, with the tips bowed inwards: the stamina have five subulate filaments, upright, of the same length with the corolla: anthers trifid at the base, incumbent: the pistillum is a turbinate germ, surrounded by the receptacle: style simple, very short: stigma simple: the pericarpium is a globular berry, one-celled (five-celled): the seeds five, large, gibbous on one side, angular on the other.

The species are: 1. *H. Helix*, Common Ivy; 2. *H. capitata*, Cluster-flowered Ivy; 3. *H. quinquefolia*, Five-leaved Ivy.

The first is a parasitical shrub, which by the support of walls, buildings, or trees, rises to a very great height, insinuating itself by a great abundance of fibres into the joints of walls, or

the bark of trees. If no support is near, the stalks trail upon the ground, taking root their whole length, so that they cover the surface closely, and are difficult to eradicate; for, where any small parts of the stalks are left, they will soon spread and multiply. Whilst Ivy is fixed to any support, or trails upon the ground, the stalks are slender and flexible; but when it has reached to the top of its support, they shorten and become woody, forming themselves into large bushy heads; their leaves are larger, more of an oval shape, and not divided into lobes like the lower leaves. While the stalks trail, Ivy does not produce any flowers; and in this state is called *Barren* or *Creeping Ivy*: but when the branches get above their support, they produce flowers at the end of every shoot; these are succeeded by berries, formed into round bunches, and turning black before they are ripe. In this state it is called *Climbing* or *Berried Ivy*. The trunk, in old trees, is covered with an ash-coloured chopped bark; in the young branches it is of a green or purple colour. The leaves are alternate, evergreen, glossy, smooth, while the plant creeps, three-lobed, or sometimes five-lobed; but when it quits its support, ovate: they are sometimes tinged with red, sometimes painted with white veins, particularly in the young branches: the petioles are long, and dilated at the base: the flowers are yellowish, or greenish white, in a very close, thick umbel, at the extremities of the twigs: the berry is placed below the receptacle of the flower. It is found wild all over Europe.

It is observed by Mr. Curtis, that few are acquainted with the beauty of Ivy when suffered to run up a stake, and at length to form itself into a standard; the singular complication of its branches, and the vivid hue of its leaves, give it, he says, one of the first places amongst ever-greens in a shrubbery.

There are varieties with silver-striped leaves, and with yellowish leaves on the tops of the branches.

The second species has the stem arborescent, eight feet high in the stove, erect, cylindrical, abruptly branched. The bark brown, a little cracked. The branches curved upwards, leafy, terminated by flowers. The leaves scattered, more crowded towards the tops of the branches, on foot-stalks, wide spreading, pointed, waved on the margin, very smooth, obscurely three-nerved, veiny, bright green. The foot-stalks various in length, nearly cylindrical, smooth, firmly fixed to the branch by an enlarged triangular base. Buds consisting of several large, roundish, smooth, yellowish scales, soon falling off, which are often tipped with the rudiments

of a leaf, and appear like abortive leaves. Racemes erect, branches generally alternate, ending in little round heads of many sessile flowers. The flowers numerous, white, so small that the structure is not readily to be understood. It is a native of Martinico.

The third has long slender shrubby rooting stems, climbing upon support to a very great height, by their fixing themselves in the walls as they advance. The leaves are quinque-foliate and deciduous, being composed of five oval, serrated lobes, closely covering the stems and branches, changing in the autumn to a reddish cast.

It has been chiefly employed to cover walls or high buildings, which it does in a short time, as it will shoot almost twenty feet in one year; but as the leaves fall off in autumn, and are late before they come out in the spring, it is not much esteemed. As it is not injured by smoke, or closeness of air, it is proper to cover buildings in great towns. It is a native of America.

Culture.—All these plants are readily increased by their trailing branches, which throw out roots their whole length.

They may also be raised by planting cuttings of the young branches in the autumn, on a shady border, which, when they have stricken root, should in the following autumn be removed to where they are to remain.

They are likewise capable of being procured by sowing the seed when perfectly ripe in the early spring, in a moist shady situation.

In training them against walls, &c. it is only necessary to direct a few of the branches at first, as they soon attach themselves to them.

These plants are capable of being employed by way of ornament in various situations.

HEDGE, a sort of fence employed occasionally both for use and ornament in gardens, as for inclosing and dividing the internal parts of the ground.

Fences of this sort are of two kinds, dead and living; but it is only the latter sort that is made use of in gardens. They are the cheapest and most ornamental that can be employed where walls, &c. are not necessary for wall-trees.

There are a great variety of shrub- and tree-plants, both of the deciduous and evergreen kinds, that may be occasionally employed for hedges; the principal of which are, in the first sort—White-thorn, Black-thorn, Crab-tree, Alder, Elder, Poplar, Willow, Hornbeam, Beech, Elm, Lime, Privet, Berberry, Sweet-brier, Rose, Syringa, and Honey-suckle.

In the latter kind—Holly, Yew, Furze, Lau-

rel, Laurustinus, Phillyrea, Alaternus, Box, Evergreen Oak, Evergreen Privet, Juniper, Virginia Cedar, Savin, Rosemary, Pyracantha, and Sea Purslain Shrub, &c.

Outside Hedges.—For this purpose the White-thorn plant forms the best, which, by being properly trained, by trimming or clipping annually, is rendered quite close, hardy, and durable.

Hedges of this sort are formed by planting young plants or sets raised from seed in the nursery, which when a year or two old, or as big as a goose-quill, up to the size of the little finger, are proper for this use. See CRATÆGUS.

The Black or Sloe-thorn is also proper for Hedges, and forms a very strong durable fence; but by its producing such abundance of suckers from the root, it is less esteemed; and as it is well armed with thorns, and of quick growth, it may be useful where the White-thorn cannot be procured.

Hedges of this nature may be raised by sowing or setting the seed or sloes in autumn, when fully ripened, in one or two small drills or trenches, where the hedge is to be, at the distance of five or six inches or more from each other, and to the depth of two or three inches. Where there are two rows, they may be about six or eight inches apart.

But it is a better method to first raise the plants in the nursery till of a proper size, as two years old, and then plant them out in rows as above.

The Crab-tree, of the apple, as well as thorny sort, are sometimes planted for Hedges; but the plants for this purpose should be such as are raised from the kernels of the wild crabs, which come up more thorny than those of the cultivated kinds, and shoot more branchy and close, quite from the bottom. These should, however, only be made use of as being of quick growth, and where the others cannot be procured.

Hedges of these may either be raised by sowing the kernels of the fruit in autumn or winter, in the place where the Hedge is intended, in drills the whole length, an inch deep, covering them that depth with earth; or the plants raised first from seed in the nursery, which, when a year or two old, may be planted out. Some plants of the Hedge may, in this case, be suffered to grow up, and afford an annual crop of crabs for verjuice. A proper number of the plants may likewise be used, as they stand in the Hedge, for stocks, to graft on with useful family or cyder apples.

The Elder plant is also used for outward Hedges where a fence is wanted as soon as pos-

sible, as being very expeditious in its growth, though not the most beautiful. Hedges are readily formed by planting large truncheons, or cuttings of the straightest upright shoots and branches, from two or three to six feet long, planted either upright a foot distance, and wattled along the top to preserve them firm and even; or placed slanting across one another chequer-wise, forming a sort of lattice-work, which is the most effectual method. In either way of planting, the lower ends of the cuttings must be sharpened, making holes to receive them fifteen or eighteen inches deep, either in the level ground, or the sides or tops of the banks.

The Alder is also proper to plant for Hedges in wet or marshy ground, as being an aquatic, and growing readily by small or large cuttings like the Elder.

It is very proper on the borders of rivers, brooks, or other waters, as its roots, and numerous suckers arising from their lower parts, form such a close thicket as effectually to preserve the earth of the banks from being undermined and washed down.

The Lombardy Poplar, as emitting numerous side-branches quite from the bottom, and being of very quick growth, is also occasionally employed to form an expeditious outward Hedge along the side or top of a bank or ditch, or to train as a loftier Hedge for shelter, shade, blind, &c.

Hedges of this plant are formed at once, if wanted, of five or six feet or more in height, by having young trees, well branched from the bottom, heading the top to the above height, and planting them in a single row a foot or two asunder. Younger sets of two or three feet in height may be planted and trained. When designed as an outward Hedge, they should generally have an outside ditch. They may be kept to an orderly thick growth, by proper clipping in the summer season.

The Willow is also sometimes planted to form outward Hedges along the sides of watery ditches, brooks, rivulets, &c. or any marshy or moist situation. They are planted either by small cuttings, or larger long sets of several feet, and inserted in the manner directed for the elder cuttings, so as to form an immediate Hedge. In either method they run up quickly, and may be kept close and regular by proper cutting in the summer season.

The Holly forms an excellent and beautiful Hedge. It is the best evergreen Hedge that can be planted for an outward fence, as it grows close, and is well furnished with leaves, which being armed with thorns, no cattle browse upon them; and being always in foliage, it affords

good shelter in winter, and is ornamental at all seasons. The only objection to it is, its slowness of growth the first four or five years.

Hedges of this sort are formed either by sowing the seeds at once in the places where the Hedges are to be, in drills an inch and half deep; or by planting young plants of two or three years old from the nursery: this is rather the best practice. They may be planted in one or two rows: though two rows planted a foot asunder, and the same distance in each row, form the thickest and most effectual hedge. They may be kept in order by clipping once or twice a year.

Yew is occasionally used as a boundary Hedge, and when full grown is very thick and close.

These Hedges should be guarded by a ditch or bank on the outside. They are best raised by setting the young plants.

The Furze plant is sometimes used for an outward evergreen Hedge, but which makes only an indifferent one, being apt to die off in gaps. As it grows well upon dry banks, or any poor dry soil, it may be used for a Hedge in such cases: these are raised by sowing the seeds in autumn at once in the place where it is designed to have the hedge, in drills an inch and a half deep.

In the general management of these Hedges it may be observed that all outward ones, designed as fences, should have a ditch and bank; the ditch, &c. serving as a defence to the young Hedge against cattle, &c. till it is grown up, and afterwards rendering the whole a more effectual outward fence. When planted on the level ground, they should be defended with railings, open pales, hurdles, or a stake and bush dead hedge, till advanced to the above growth. Where a ditch and bank is intended, the ditch on the outside should be three feet wide at top, two or three deep, sloping to one wide at bottom; raising a low bank on the inside on which to set the plants, which may be planted either on the side of the inner bank, in two rows one above the other, a foot asunder, as commonly practised for quick Hedges, putting them in in forming the ditch and bank; or be planted entirely on the top of the bank, first forming the ditch and bank, and levelling the top so as to form a sort of border or bed extending longways, planting the sets in one or two rows the whole length; but two rows a foot asunder is the most eligible for all outward fences, as they always form the thickest, strongest, and most effectual Hedge-fences.

In whichever way the planting is performed, the roots of the sets should always be bedded in,

in the finest loose mellow mould that can be procured. With this care large plants will succeed in the most perfect manner.

Division Hedges.—When Hedges are designed for middle fences to divide grounds, two sided banks are raised a yard high, and as broad at top, having a slight ditch on each side, and each side of the bank formed with square spit-turfs from the adjoining ground, and the middle filled up with mould from the ditches on each side; so that, when finished, it forms a yard-wide bed all the way on the top. Along the middle of these, plant two rows of hedge-sets, or sow the seed in drills as has been directed.

But where no ditch or raised bank is required, the place for the Hedge should be marked out on the level ground, two or three feet broad, digging it along one or two good spades deep. The sets should then be planted in one or two rows, ranging along the middle; or the seeds sown at once where it is intended to have the Hedge, in two drills, a foot asunder, the whole length. For interior garden Hedges one row is generally sufficient, either of sets planted or seeds sown. In this mode, where the sets are of a tolerably large size and strength, it will be proper to form a trench, in which to plant each row, with the roots all a regular depth, and the tops upright; or, if quite small young sets, they may be planted with a dibble.

In the first method, one or two narrow trenches should be formed longways, for a single or double row of sets, with the spade, by cutting out a narrow trench six or eight inches deep all along, for each row of plants, making one side upright; then the sets should be placed in the trench close against the upright side, six, eight, or ten inches asunder in the row, with their tops all upright, several inches above ground; and turn in the earth directly upon the roots, &c. to the depth of the trench, treading the earth there to moderately firm, to fix the plants in the proper position as the work proceeds;—and if intended to plant two rows of sets to form a double Hedge, make another trench a foot distance from the first, and plant the sets in the same manner and distance; placing those of the second trench opposite the interval spaces of the first row of sets, earthing them in regularly as the others, and treading it down close to the sets, evenly along the surface.

In trench-planting, the sets may likewise be put in, by planting them as you proceed in digging the trench; marking out with the spade a foot-wide trench, digging out a spade depth of earth at one end, the width of the trench, then placing a set therein close to one side; or, if intended to have a double Hedge, placing two

sets, one to each side of the trench; and then, in either method, proceeding in digging, turning one or two spades of earth in upon the roots of the sets; and at eight or ten inches from these, plant one or two sets more in the same order, digging and earthing them in as the others; and thus proceed, digging along and planting the row of sets as the work advances; observing in double rows to place the sets opposite to the intervals in the rows of each other.

In planting with the dibble, the ground should be previously well dug over a spade deep; then trimming the straggling roots and tops of the plants, with the dibble make a hole for each set at the above distances, inserting the roots a proper depth, and close the earth well about each set, as planted.

In forming Hedges by sowing the seeds at once in the intended places for the plants to remain, the ground should be properly dug, and then either one drill for a single row, or two for a double Hedge, should be formed, a foot asunder, sowing the seed tolerably thick in them, and covering it an inch or two in depth with the earth. The place should be kept very clear from weeds, both before and after the plants appear; and if the plants are any where too thick, they may be thinned out at the proper season.

All such Hedges as are exposed to cattle, must, as soon as planted, be protected either with a stake and bush Hedge, hurdles, or rails, for four or five years, till they grow up. They should also be duly hoed and weeded while young, and kept very well cleared from all sorts of weeds. This should be particularly attended to the first two years.

And where designed to be trained, they should be annually clipped over in summer, being topped sparingly while young, only just trimming off the tops of the straggling and run-away shoots, to preserve a little regularity, that the whole may advance equally, and promote lateral wood to thicken them as they advance; and cut in moderately on the sides. But when arrived at nearly their proper height, as four, five, or six feet, or more, they may be trimmed in close on the sides and top annually, to preserve them thick and within their proper bounds, cutting the sides always first as even as possible; then the tops, which should also be cut as even as a line; always cutting in nearly to the old wood of the former year's clipping, otherwise the Hedges will get too broad; the tops being always kept narrower than the bottoms.

The neatest mode of cutting them at the tops is that of the ridge form.

Regular Hedges were formerly in great request in gardens: almost all the different com-

partments and divisions of pleasure-grounds were surrounded with them, of various sorts of trees and shrubs, both evergreens and deciduous, which being neatly trained and clipped once or twice annually, sometimes appeared very ornamental; but from their surrounding, shutting out, and obstructing the sight of the different shrubbery borders, clumps, and other parts, as well as their concealing the grounds, and appearing stiff and formal, they are at present little in use. They are only introduced occasionally, either as outward or division fences, or for shelter, shade, &c. in particular compartments, and to cover unsightly objects.

The hedges formed of lofty elm, lime, beech, and some other sorts of deciduous trees, in pleasure-grounds, for ornamental training, are also laid aside, as being stiff, awkward, and troublesome in keeping in order.

The various fancy devices in hedge-work have likewise given way to a better and more easy rural taste.

In addition to what has been said on hedges formed of the more common sorts of plants, it may be observed, that the laurel, though a singularly beautiful evergreen, adorned with a noble large foliage, forming vigorous shoots, never grows so compact, or is so easily kept in form as some other sorts; besides, its leaves being very large, when clipped with shears, they are unavoidably cut through, and so stubbed and mangled as to have a disagreeable appearance. In these hedges, therefore, instead of performing their annual training with shears, the shoots should be trimmed off with a knife, to preserve the leaves entire. This plant is proper to train Hedge-fashion to hide any disagreeable fence, and will grow either under trees, in the shade, or in an open exposure, and is of quick growth.

Hedges of it should be planted in one row, at from eighteen inches to three feet distance, according to the size of the plants at the time of planting them out.

The *Laurustinus*, from its being not only an evergreen, but a beautiful flowering shrub, forms a delightful Hedge for ornament, as it is covered with flowers in winter and spring. It is also well adapted for training hedge-fashion against any shabby fence or naked wall. In either method, it should be planted in one row, at from eighteen inches to three feet distance.

The *Phillyrea* and *Alaternus*, being beautiful evergreens, form very ornamental Hedges. They greatly resemble each other; but the *phillyrea* being the strongest grower, as well as thickest shooter, is the more proper for a hedge: for variety both may be used: they are also good evergreen shrubs for training hedge-fashion

against unsightly or naked walls, or paling fences, as they soon cover them; and if the common green and variegated kinds are intermixed, in either mode of hedge-work, they have a delightful effect.

They should be planted in one row, at from about fifteen or eighteen inches to two or three feet distance between plant and plant.

The Bay is also capable of forming a tolerable evergreen Hedge for variety, and may be led up six or seven feet high; placing the plants half a yard distance.

The Evergreen Oak is likewise a proper plant to form a tall Hedge, as it may be trained fifteen or twenty feet high, if required. It should be planted in one row, setting the plants one, two, or three feet asunder, according to their size or strength.

The Evergreen Privet will also form a handsome good Hedge five or six feet high, by planting the sets a foot asunder, and training it up narrow at top.

The Tree-box makes a very close and beautiful low evergreen hedge, four or five feet high, when the sets are planted about a foot asunder.

The lesser sorts of Evergreens are sometimes employed for variety to form moderate Hedges, from about three or four to five or six feet in height; they should be planted in a row at from twelve or eighteen inches to two feet asunder.

All the sorts of Evergreens are proper for Hedges, when from about twelve or eighteen inches to two or three feet in height; though the Holly succeeds better when planted in its younger growth.

The proper season for planting them is either in autumn or in spring; for it is not safe to transplant evergreens in the middle of winter. Where the soil is moist the latter is the best period; but in dry gravelly soils, the former.

In planting these sorts of evergreens, for middle or internal Hedges, no ditches or banks are necessary as for outward Hedges for fences; so that, in the place where the Hedge is designed, a sort of border should be marked out the whole length, two or three feet wide, and dug or trenched over for the reception of the plants: the plants need only, in these cases, be planted in a single row.

Among the deciduous plants, the Hornbeam forms a beautiful summer Hedge; being a moderate but very close shooter, well furnished with leaves, and capable of being trained up from about six or eight to twelve or fifteen feet high; but the leaves, though they wither in autumn, remaining firmly attached to the branches all winter, make but a shabby appearance at that season. It is, however, on this account superior to most other deciduous Hedges

for the purpose of forming shelter in the winter. For Hedges, it should be planted in single rows, at about half a yard asunder in the plants, to form a close moderate hedge as soon as possible; but if designed to be brought up pretty tall, and the plants are spreading, they should be set about three feet distant.

The Beech also forms a close regular Hedge, from about six or eight to fifteen or twenty feet high: the leaves withering on the branches in autumn, continue dropping off most part of the winter. These plants should be planted in the same manner as the Hornbeam.

The Elm forms a close, even, and beautiful Hedge, and may be trained from six or eight, to ten, twenty, or thirty feet high, forming a close fence from bottom to top. The plants for this purpose may be from three or four, to eight or ten feet or more in height, and should be planted in a single row from two or three, to six or eight feet distant, according as they are less or more spreading, and as wanted to form a close Hedge as soon as possible.

The Lime-tree is sometimes employed for ornamental Hedges for variety, but is much inferior to the other deciduous sorts, as it becomes thin and shabby by clipping, and is thinly leaved.

Other low kinds of shrubs of this sort are sometimes employed for variety: some sorts, such as roses, honeysuckles, and syringas, when formed into low Hedges, besides their property as Hedges, produce great quantities of flowers, and afford a fine fragrance.

The plants for this use are of a proper size when from about one foot to a yard in height, according to the sorts. It is best to plant them young, choosing such as are well furnished with plenty of side or lateral shoots, that they may form a close hedge quite from the bottom. They may all be planted either in autumn or early spring, in open weather.

The method of planting them is nearly the same as in the evergreen kinds.

These sorts of Hedges should be trained and clipped in the same manner as directed above.

In order to keep Hedges in perfect good order, they should be clipped twice every summer: the first time about midsummer, when they have made their summer shoot; and the second clipping towards the middle or latter end of August. But when this is done only once in the summer, the clipping should not be performed until the beginning of August, as when cut sooner they shoot again, and appear almost as rough the remainder of the summer, and all winter, as if it had not been done at all.

HEDGE-CLIPPING MACHINE, a sort of machine-scaffolding, or stage, ten, twenty, or thirty feet high, or more, with platforms at dif-

forest heights, to stand upon, the whole being made to move along upon four low wheels. It is composed of four long poles for uprights, well framed together, eight or ten feet wide at bottom, narrowing gradually to four or five at top, having a platform or stage fixed at every seven or eight feet height, with one near the top, each having a rail waist-high: there is a sort of ladder formed on one side to ascend by, &c. Upon this machine a man or two may be employed on each stage or platform, trimming the hedge with shears, and sometimes with a light garden hedge bill fixed on a handle from three to five or six feet long, which is more expeditious, though it will not make so neat work as cutting with shears. It is very useful in clipping high hedges or trees. And it may be employed for dressing, cleaning, pruning, and nailing different sorts of trees, as well as various other purposes. In extensive pleasure-grounds and gardens they are essentially necessary.

HEDYSARUM, a genus containing plants of the herbaceous flowering kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leafed perianthium, half-five-cleft: clefts subulate, upright, permanent: the corolla is papilionaceous, streaked: banner reflex-compressed, ovate-oblong, emarginate, long: wings oblong, narrower than the other petals, straight: keel straight, compressed, broader outwardly, transversely blunt, from the base to the swelling part bifid: the stamina have diadelphous filaments, (simple and nine-cleft,) bent in at a right angle: anthers roundish, compressed: the pistillum is a slender germ, compressed, linear: style subulate, bent in with the stamens: stigma very simple: the pericarpium is a legume with roundish, compressed joints, two-valved, and containing one seed: the seed kidney-shaped and solitary.

The species chiefly cultivated are: 1. *H. Alagi*, Prickly Hedysarum; 2. *H. Canadense*, Canadian Hedysarum; 3. *H. gyrans*, Sensitive Hedysarum; 4. *H. coronarium*, Common Hedysarum, or French Honeysuckle; 5. *H. flexuosum*, Waved-podded Hedysarum; 6. *H. humile*, Dwarf Hedysarum; 7. *H. spinosissimum*, Prickly Hedysarum.

The first has the stems shrubby, about three feet high, branching out on every side: the leaves are shaped like those of broad-leaved Knot-grass, very smooth, of a pale green colour, on short foot-stalks. Under these come out thorns, near an inch long, of a reddish brown colour. The flowers come out from the side of the branches in small clusters, are of a

purple colour in the middle, and reddish about the rims. It is a native of the Levant.

The second species is an upright plant, and mostly smooth: the stem streaked and angular: the leaflets are lanceolate: the stipules awl-shaped. It is perennial, and a native of Virginia, &c., flowering in July and August.

The third has a branching perennial root (biennial, annual): the stem shrubby, three feet high, wand-like, upright, very smooth, round, without knots: the leaves are alternate, petioled, hanging down or spreading, often vertical, sometimes simple but usually ternate, especially in adult plants: the middle leaflet lanceolate, long, flat, quite entire, very smooth, veined; the side ones very small, and seeming rather to be appendicles than leaflets; they are on short petioles, which are remarkable for a motion peculiar to them. The flowers many and nodding. It is a native of Bengal.

The fourth species has a biennial root: the stems from two to three feet high, hollow, smooth, and branching: the leaves are composed of five or six pairs of oval leaflets, terminated by an odd one: they are alternate, and from the angles which they form with the stem and branches, peduncles come out five or six inches in length, sustaining spikes of beautiful red flowers, which open in June and July, and perfect seeds in September. It is a native of Spain, &c.

There is a variety with white flowers.

The fifth species is annual, and has some resemblance to the foregoing, but is much smaller: the stalks rise near a foot high, and the leaves are composed of two or three pairs of ovate leaflets, terminated by an odd one: the flowers come out in spikes at the top of the stalks, and are of a pale red, intermixed with a little blue. They appear in July, and are succeeded by jointed pods. It is a native of the Levant.

The sixth has a perennial root: the stems half a foot in length, usually with one branch and leaf only: the leaflets obovate-oblong, villose underneath: the spike ovate. It is a native of the South of France, &c., flowering in July and August.

The seventh is an annual plant: the leaflets four or five pairs, with an odd one, narrow and oblong: the stem terminated by small spikes of purple flowers, which are succeeded by small rough legumes. It is a native of Spain, &c.

Culture.—All these plants are capable of being raised by sowing the seeds in the early spring.

In the first sort they should be sown in pots of light earth, and plunged in a moderate hot-bed. When the plants are of some growth they should be removed into separate pots, and be replunged into a very moderate hot-bed, being



Painted by Syd Edwards
 1 *Helianthus multiflorus*
 Perennial Sun flower

London Published July 1 1905, by G. Kearsley, Fleet Street

Engraved by F. Sangm

2 *Hedyсарum obscurum*
 Creeping-rooted Hedyсарum

properly shaded till they are well rooted. They should afterwards be gradually inured to the open air, being protected in winter as there may be occasion.

The seeds are often long in coming up.

In the second sort the seed may be sown in the early spring, as April, on a bed of light fresh earth, or where they are to remain. In the first case they should be removed where they are to grow in the autumn. These plants should not be often removed afterwards.

The third sort is raised in the same manner as the first, and should have free air in the summer, and be protected occasionally in the winter.

The other sorts are all increased in the same manner as the second, being pricked out while young, and in the autumn removed to the places where they are to grow and flower.

As the biennial sorts either decay or dwindle after flowering, they should be raised in fresh supplies every year from seed.

These plants are very ornamental in the beds, borders, clumps, and other parts of pleasure-grounds, and some of them among other potted plants.

HELIANTHUS, a genus containing plants of the hardy herbaceous flowery kinds.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositæ Oppositifoliæ*.

The characters are: that the calyx is common imbricate, somewhat squarrose, expanded; scales oblong, broadish at the base, gaping every where at the tips: the corolla compound radiate: corollets hermaphrodite, very numerous in the disk: females fewer, much longer in the ray: proper of the hermaphrodites cylindric, shorter than the common calyx, bellying at the base, orbicular, depressed: border five-toothed, sharp, spreading: of the females ligular, lanceolate, quite entire, very long: the stamina in the hermaphrodites consist of five filaments, curved, inserted below the belly of the corollet, the length of the tube: anther cylindric, tubular: the pistillum in the hermaphrodites is an oblong germ: style filiform, length of the corollet: stigma two-parted, reflex: in the females, germ very small: style and stigma none: there is no pericarpium: unchanged calyx: seeds in the hermaphrodites solitary, oblong, blunt, four-cornered, compressed at the opposite angles; the inner ones narrower, crowned with two lanceolate, acute deciduous chaffs; in the females none: the receptacle chaffy, large, flat: chaffs lanceolate, acute, two separating each seed, deciduous.

The species cultivated are: 1. *H. annuus*, Annual Sun-flower; 2. *H. indicus*, Dwarf Annual Sun-flower; 3. *H. multiflorus*, Perennial

Sun-flower; 4. *H. tuberosus*, Tuberous-rooted Sun-flower, or Jerusalem Artichoke.

There are several other species of the perennial sort that may be cultivated.

The first has an annual root: the stem single or branched, from five or six to ten or fourteen feet in height, and in hot climates twenty or more; when vigorous, the size of a man's arm: the leaves are alternate, a span or a span and a half in length, and almost as much in breadth, rough, serrate, acuminate, hanging down at the end, on long petioles: the flower single (sometimes several), nodding, a foot or more in diameter. It is a native of Mexico, flowering from June to October. Martyn observes, that as to its turning with the sun, it is a vulgar error; Gerarde could never observe it; and he has seen four flowers on the same stem pointing to the four cardinal points.

There are varieties with double flowers, deep yellow, and sulphur-coloured.

The second species is perhaps only a variety of the first, though constant; but the leaves are convex above in the disk, and of a darker green. The peduncles are less thickened at top, or rather of an equal thickness every where, whence the flowers nod less. The scales of the calyx, except the inmost row, grow out into petioled pendulous leaflets. It grows only from eighteen inches to three feet in height. It probably comes from Mexico or Peru.

The third has the stem and peduncles scabrous: the leaves cordate-ovate: the calyxes loosely imbricate, neither squarrose nor drooping, consisting of forty to fifty scales: the stems many, upright, from five or six feet to eight or nine in height, branching, the stem and each branch terminated by a flower, the principal one sometimes nine or ten inches in diameter, the lateral ones gradually smaller: the leaves some opposite, others alternate. There is a constant succession of flowers from July to November.—It is a native of Virginia.

In the fourth species the stems are several, rough, hairy, streaked, from eight, ten, or twelve to sixteen feet in height, the size of a child's arm: the leaves alternate, light green, rough, pointed, eight inches broad, and ten or eleven inches long, deeply serrate, smaller towards the top: the branches many, long, from bottom to top: the flowers terminating, small; florets in the ray twelve or thirteen. These seldom blow before October, and in some seasons they do not expand at all. The seeds never ripen here: the roots creeping, with many tubers clustered together, thirty, forty, or fifty from one plant, measuring a peck, or in good soils half a bushel; they are, like the common potatoe, red on the outside, and very irregular

in their shape, the size of a man's fist in the largest. It is a native of Brazil.

Culture.—All these flowery plants are easily increased, the two first sorts by seeds, and the others by dividing their roots.

The seeds should be sown in the early spring months, in the places where the plants are to grow and flower, in patches of three or four seeds together. When the plants are up they may be thinned out to one or two of the best.

They may be had more forward by sowing them on a moderate hot-bed, under glasses, and afterwards transplanting them to the situations where they are to grow.

The divided roots may be planted out in the places where they are to remain, either in the autumn or the early spring months.

These plants produce a fine ornamental effect in the back parts of the borders, clumps, and other parts of pleasure-grounds, and by sowing at different times may be kept in flower for a considerable length of time.

In the perennial sorts the decayed stems should be cleared away when they begin to decline. They continue long.

The last, or tuberous-rooted sort, is increased by planting the smaller roots, or the larger ones cut in pieces, a bud being preserved to each, either in the spring or autumn, allowing a good distance, as the roots multiply greatly. In the autumn following, when the stems decay, the roots may be taken up for use.

When cultivated for a crop, the sets should be planted in an open part of the kitchen-garden, in rows three feet or more asunder, and at least eighteen inches distant from each other, to the depth of four or five inches. The best time is the latter end of March, in a light soil. The roots may be taken up for use in September, and the whole crop housed in October. When kept in sand in a dry place, they continue the whole winter very good.

HELICONIA, a genus containing a plant of the tall herbaceous perennial kind, for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters are: that the calyx consists of common and partial spathes, alternate, distinct, with hermaphrodite flowers: there is no perianth: the corolla has three petals, oblong, channelled, erect, acute, equal: nectary two-leaved; one leaflet nearly equal to the petals; the other very short, channelled, hooked, opposite: the stamina consist of five (or six) filaments, filiform: anthers long, erect: the pistillum is an inferior oblong germ: style shorter than the stamens: stigma long, slender, curved, with a terminating head: the pericarpium is an oblong

capsule, truncate, three-sided, three-celled: seeds solitary, oblong.

The species is *H. Bihai*, Bastard or Wild Plantain.

It is a large herbaceous plant, from ten to twelve feet in height: the leaves oblong, narrower at both ends, entire, marked with parallel lines, erect, thick, and very smooth. Petioles the length of the leaves or more, round, thick, channelled above. Scape upright, the length of the petioles, round, thick, smooth: spadix simple, upright: common spathes several (eight to ten), rigid, cordate, embracing, from erect, spreading, acuminate, distich, yellowish brown: the flowers are in bundles concealed within each spathe: partial spathes membranaceous, whitish, the length of the flowers, which are distinct, subsessile, pale or greenish yellow. It is a native of the West Indies, flowering in spring.

Culture.—These plants are increased by suckers arising from the root, particularly after having fruited, which may be taken off any time in summer, with fibres to them, planted in pots, and plunged in the bark-bed, where they will readily grow, and afterwards shifted into larger pots as they advance in height.

They afford variety among other stove-plants.

HELICTERES, a genus containing plants of the shrubby exotic kind, for the stove.

It belongs to the class and order *Gynandria Decandria*, and ranks in the natural order of *Columniferæ*.

The characters are: that the calyx is a one-leaved perianthium, tubulous, half-ovate, obliquely spreading, unequally five-cleft, coriaceous: the corolla has five petals, oblong, equal in breadth, fixed to the receptacle, longer than the calyx: claws long, with a tooth on each side at the base: nectary of five petal-shaped, lanceolate, very small leaflets, covering the germ: the stamina have five, ten, or more filaments, very short: anthers oblong, lateral: the pistillum is a filiform receptacle, very long, bowed back, bearing an ovate germ at the tip: style subulate, longer than the germ: stigma subquincifid: the pericarpium consists of five capsules, often twisted spirally, one-celled: the seeds very many and angular.

The species cultivated are: 1. *H. baruenensis*, Small-fruited Screw-tree; 2. *H. isora*, Great-fruited Screw-tree.

The first is an upright tree, about twelve feet in height, branching but little. The younger branches, peduncles, and petioles are tomentose: the leaves acute, wrinkled, tomentose, and whitish underneath, somewhat hairy on the upper surface, petioled, alternate, deciduous: the stipules awl-shaped: the peduncles many-flowered, terminating, thick: about the pedicels are

large, depressed, green glands, uncertain in number, black when dried. The flowers have no scent. It is a native of the island of Barú.

The second species is likewise a small upright tree, about twelve feet high, branching but little: the younger branches, peduncles, calyxes, and leaves tomentose: the leaves petioled, alternate, acute: the stipules in pairs, bristle-shaped: the peduncles many-flowered, terminating, glandular. It is a native of Jamaica, flowering here in June and July.

Culture.—In these plants the increase is effected by seeds, which must be sown upon a hot-bed in the spring, and when the plants are come up sufficiently strong, they should be each planted in a separate small pot filled with light earth, being plunged into a moderate hot-bed of tan, due shade from the sun being given till they have taken new root. They should afterwards be treated in the same way as other tender shrubs, raising the glasses every day in proportion to the weather, that they may have fresh air. In summer the plants should remain under the frames, if there is sufficient height; but in autumn be replunged into the tan-bed in the stove, where they should always remain, being careful to shift them into larger pots when they require it, and not give them too much wet in the winter. In summer they should have a large share of air in warm weather, and be often refreshed with water.

These plants are very ornamental among other stove exotics.

HELIOTROPIUM, a genus comprising plants of shrubby, herbaceous, annual, and biennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifolice*.

The characters are: that the calyx is a one-leaved perianthium, tubular, five-toothed, permanent: the corolla monopetalous, salver-shaped: tube the length of the calyx: border flat, half-five-cleft, obtuse: clefts smaller, alternate, more acute, between the larger ones: throat naked: the stamina have five filaments, very short in the throat: anthers small, covered: the pistillum has four germs: style filiform, length of the stamens: stigma emarginate: there is no pericarpium: calyx erect, unchanged, cherishing the seeds in its bosom (berry): the seeds four, ovate, acuminate (nuts four, naked or corticate, not perforate.)

The species cultivated are: 1. *H. Peruvianum*, Peruvian Turnsole, or Heliotrope; 2. *H. Indicum*, Indian Turnsole, or Heliotrope; 3. *H. parviflorum*, Small-flowered Turnsole, or Heliotrope; 4. *H. Curassavicum*, Glaucous Turnsole, or Heliotrope; 5. *H. Canariense*, Canary Heliotrope.

The first rises with a shrubby stalk from two to three feet high, dividing into many small branches: the leaves are three inches long, and an inch and half broad in the middle, hairy, greatly veined, and ash-coloured on their under side, on short foot-stalks: the flowers are produced at the ends of the branches in short reflex spikes, growing in clusters: the peduncles divide into two or three, and these again into smaller ones, each sustaining a spikelet of pale blue flowers, which have a strong sweet odour. It grows naturally in Peru, flowering here great part of the year.

The second species has an herbaceous stem, a foot and a half or two feet high, round, scabrous, hirsute, subdivided: the leaves cordate-spatulate, ovate, slightly serrate, wrinkled, nerved, hairy, softish: on pretty long petioles, two inches and a half long, and one and a half broad in the middle: the spikes terminating, single or solitary; sometimes, but very seldom, double; sometimes also from the sides of the branches, reflex only at the end: the flowers sessile, pointing one way, approximating in a double row, small, blue. It is a native of the West Indies, and annual or biennial, flowering in July and August.

There is a variety which is a smaller plant, seldom more than two feet high; the leaves an inch and half long, and about half an inch broad: the spikes of flowers very slender, and not more than two inches long: the flowers small, and of a light blue colour.

The third has an erect stem, pubescent, a foot high: most of the leaves opposite, except those in the middle of the stem, which are alternate, petioled, lucid, and acute: the peduncles opposite to the leaves, or from the divisions of the stem, longer than the leaves, erect, each having two recurved, imbricate spikes of white flowers. It is annual, and a native of the West Indies, flowering in July and August.

The fourth species has an annual root: the stem round, very smooth, with a glaucous bloom on it: the branches trail on the ground, and grow a foot (or sixteen inches) in length: the leaves are somewhat blunt, quite entire, upright, on very short petioles, some alternate, others opposite, whitish, and smooth: the spikes in pairs on a common peduncle, and recurved: the corolla white, with a yellow base, and an open throat. It is a native of the West Indies, flowering in June and July in this climate.

The fifth rises with a woody stalk three or four feet high, dividing into many branches, with leaves upon long foot-stalks; hairy, and of an ash colour on their under side: the flowers are produced from the side of the branches on pretty long peduncles, each sustaining four short roundish spikes or heads, which divide by pairs,

and spread from each other: the flowers are white, and appear in June and July, but are not succeeded by seeds in this climate. The leaves, when bruised, emit an agreeable odour, for which it is by some much esteemed. The gardeners give it the title of Madam Maintenon. It grows naturally in the Canary Islands.

Culture.—The first is raised either by seeds or cuttings. In the first method the seeds may be sown upon a moderate hot-bed, or in pots to be plunged in a hot-bed in the early spring. When the plants have attained some growth, they should be removed into separate small pots filled with light earth, replunging them into the hot-bed, and giving them proper shade till well rooted.

They should afterwards be gradually inured to the open air, so as to be set out in warm situations in the summer. In the autumn and winter they should have the protection of a good green-house.

The cuttings should be planted in pots of light earth in the summer season, plunging them in a mild hot-bed. They soon take root, and afterwards require the same management as the seedlings. They seldom, however, make so good plants.

The three following sorts are increased by sowing the seeds on a hot-bed in the early spring, removing them as the heat declines to another hot-bed when necessary, managing them as Balsams and other tender annuals; and in the middle of the summer, removing them to the situations where they are to flower, with balls of earth about their roots.

The last sort is increased by planting cuttings of the young shoots in the summer in pots, or in a shady border, giving them water pretty freely. When well rooted, they may in the latter case be carefully taken up and put in pots, placing them in shady situations till fresh rooted.

They afterwards require the protection of the green-house from frosts and severe weather, being placed with plants of the more hardy sorts, such as Myrtles, and that require free air in mild weather.

The first and last sorts are very ornamental among potted green-house plants of the more hardy kinds; and the others among the more tender flowery plants in pots and borders.

HELLEBORE. See **HELLEBORUS**.

HELLEBORUS, a genus containing plants of the herbaceous perennial kind.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx, unless the corolla, which in some species is permanent, be considered as such: the corolla has five

petals, roundish, blunt, large: nectaries several, very short, placed in a ring, one-leaved, tubular, narrower at bottom: mouth two-lipped, upright, emarginate, the inner lip shortest: the stamina consist of numerous subulate filaments: anthers compressed, narrower at bottom, upright: the pistillum consists of about six germs, compressed: styles subulate: stigmas thickish: (five or more:) the pericarpium consists of capsules (leguminous, beaked) compressed, two-keeled: the lower keel shorter; the upper convex, gaping: the seeds several, round, and fixed to the suture.

The species cultivated are: 1. *H. hyemalis*, Winter Hellebore, or Yellow Winter Aconite; 2. *H. niger*, Black Hellebore, or Christmas Rose; 3. *H. viridis*, Green Hellebore; 4. *H. foetidus*, Stinking Hellebore, or Bear's-foot; 5. *H. lividus*, Livid Purple, or Great Three-flowered Black Hellebore.

The first has a tuberosus transverse root, with many dependent fibres, putting up several naked stems or scapes, simple, smooth, round, from an inch or two to four inches in height, terminated by a single leaf, spreading out horizontally in a circle, divided into five parts almost to the base, and the parts simple, or divided into two, three, or four lobes. In the bosom of this sits one large, upright, yellow flower. It is native of Lombardy, and flowers with us from January to March.

The second has transverse roots, externally rough and knotted, with many dependent fibres, and some large roots striking down; the scapes from six inches to near a foot in length, round, upright, variegated with red, rising from a sheath, and terminated usually with one flower, sometimes two, and very rarely three: corolla very large, generally white at first, but frequently with a tint of red, growing deeper with age, but finally becoming green. It is a native of Italy, &c. flowering from December to March. Martyn observes, that "it has the name of *Black Hellebore* from the colour of the root; and of *Christmas Rose*, from the time of flowering and the colour of the corolla."

The third has a round stem, a little branched at top, but not near so much as in the next sort; leafy, reddish at the base, upright, smooth, a foot or eighteen inches in height: the leaves not of a stiff leathery consistence, as in the next species, but soft and of a lighter green; those from the bottom are on long petioles, but those on the stem sit close to their sheaths: the leaflets (seven to ten) lanceolate, acuminate, sharply serrate, smooth, gashed, usually trifid, the divisions sometimes deeply lobed; and at the base of each peduncle is a similar leaf, only smaller: the peduncles axillary, an inch long, round; supporting two (sometimes only one) nodding,



Painted by Syd. Edwards

London Published Feb 1 1806 by G. Kearsley Fleet Street

Engraved by F. Sanford

Helleborus viridis.
 1 Green Hellebore

Hypericum hircinum.
 2 Fetid St. John's-Wort



Painted by Syd Edwards

London Published June 1845 by G. Kearsley Fleet Street

Engraved by F. Sanyon

Hemerocallis fulva
1 Town Lily

Hibiscus syriacus
2 *Althaea Frutescens*

green flowers. It is a native of France, &c. flowering in March and April.

The fourth has a small but bent root, with a prodigious number of slender dark-coloured fibres: the stem is from eighteen inches to near a yard in height, towards the bottom round, strong, naked, marked with alternate scars, the vestiges of former leaves; dividing and subdividing at top into many branches, producing great abundance of flowers pendent, of a pale yellowish colour: the leaves composed of eight or nine long narrow lobes, joined at their base, commonly four on each side, united at the bottom, and one in the middle of the foot-stalk, serrate, and ending in acute points; those on the lower part much larger than those on the upper, of a deep green colour. It is a native of Italy, &c. flowering from November or December to April.

The fifth species resembles the third, but differs in having trifoliate leaves, broader and entire, their surface being smoother, and the stalks rise higher than either of the common sorts. It flowers from January to May.

Culture.—The first sort is increased by planting the off-sets from the roots after the leaves are decayed, in the latter end of the summer season, in the places where they are to flower, in patches of several roots together. They have the best effect when intermixed with the Snow-drop, as being of similar growth, and flowering about the same time. The off-sets may be separated from the old plants every three or four years.

The second sort is increased by parting the roots in the autumn, and planting them out in moist warm sheltered situations, in the borders or other parts where the soil is fresh and unmanured. And to have it flower well, it should be protected by glasses in the winter. Some plants may be potted in this intention.

The third and fourth sorts are raised by sowing the seeds in the autumn or early spring, either in the places where they are to grow, or in beds for the purpose, afterwards thinning them out to a few plants, or transplanting them into other beds, at the distance of a foot in the rows.

They rise well from self-sown seed, and succeed in shady situations very well.

The last sort is increased by seeds and parting the roots.

The well ripened seeds should be sown, or the roots planted out, in the autumn, either in pots of light fresh earth, or in warm protected situations in the borders. The plants should afterwards be protected in the green-house, or by hand-glasses in the winter. But they do not increase fast in either of these ways.

These are all ornamental plants; the first sort in the fronts of beds, borders, and clumps; and the third and fourth in the large borders and wilderness parts of pleasure-grounds. The se-

cond and last sorts produce a fine effect among collections of potted plants.

HELMET-FLOWER. See ACONITUM.

HELONIAS, a genus containing plants of the hardy herbaceous flowering perennial kind.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Coronarieæ*.

The characters are: that there is no calyx: the corolla has six petals, oblong, equal, deciduous: the stamina have six subulate filaments, a little longer than the corolla: anthers incumbent: the pistillum is a roundish germ, three-cornered: styles three, short, reflex: stigmas blunt: the pericarpium is a roundish capsule, three-celled: the seeds roundish.

The species are: 1. *H. bullata*, Spear-leaved Helonias; 2. *H. asphodeloides*, Grass-leaved Helonias.

The first has a perennial root, composed of many thick fleshy fibres: the leaves spreading near the ground, and sitting close to the root at their base, of a light green colour, having six longitudinal nerves, which appear strongest on the under side; they are four or five inches long, two or three broad in the middle, narrowing gradually to both ends, and continuing green all the year. In the centre of these springs up a single erect stalk, a foot in height, having a few vestiges of small leaves, ending in sharp points, standing alternately close to the stalk: this is terminated by a close obtuse spike of dark-red flowers, with petals spreading open, flat: the filaments are twice the length of these; and the anthers are four-cornered, of a blue purple colour. It is a native of America, flowering the latter end of June (April and May).

The second species has the stem extremely simple, two feet high: the leaves alternate or scattered, upright, even, but rugged at the edge: the flowers are white, in a simple, terminating raceme, on peduncles longer than the flowers. It is a native of Pennsylvania, &c. flowering in May and June.

Culture.—These plants are increased by planting off-sets taken from the roots in autumn; or by sowing the seeds as soon as they are ripe, in a light fresh soil: they are hardy enough to thrive in the open air; but must not be removed oftener than once in three or four years. They require the same length of time in coming to flower when raised from seed.

These plants afford variety among others of similar growth in the principal flower compartments.

HEMEROCALLIS, a genus containing plants of the herbaceous flowery perennial kinds.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliacæ*.

The characters are: that there is no calyx: the corolla is six-parted, bell-funnel-form: tube short: border equal, spreading, more reflex at top: the stamina have six subulate filaments, the length of the corolla, declining; upper ones shorter: anthers oblong, incumbent, rising: the pistillum is a roundish germ, furrowed, superior: style filiform, the length and situation of the stamens: stigma obtusely-three-cornered, rising: the pericarpium is an ovate-three-lobed capsule, three-cornered, three-celled, three-valved: the seeds very many, and roundish.

The species are: 1. *H. flava*, Yellow Day-Lily; 2. *H. fulva*, Copper-coloured Day Lily.

The first has strong fibrous roots, to which hang knobs, or tubers, like those of the Asphodel, from which come out leaves, two feet long, with a rigid midrib, the two sides drawing inward, so as to form a sort of gutter on the upper side: the flower-stalks rise two feet and a half high, having two or three longitudinal furrows; these are naked, and at the top divide into three or four short peduncles, each sustaining one pretty large yellow flower shaped like a Lily, having but one petal, with a short tube, spreading open at the brim, where it is divided into six parts; these have an agreeable scent, from which some have given them the title of Yellow Tuberose. It is a native of Siberia, &c. flowering in June.

There is a variety with smaller roots; the leaves are not near so long, have not more than half the breadth, and are of a dark green colour: the flower-stalk is a foot and half high, naked and compressed, without furrows; at the top are two or three yellow flowers, which are nearer the bell-shape than the others, and stand on shorter peduncles.

The second species is a much larger plant than the first, and the roots spread and increase much more; the roots have very strong fleshy fibres, to which hang large oblong tubers: the leaves are near three feet long; hollowed like those of the former, turning back toward the top: the flower-stalks are as thick as a man's finger, and rise near four feet high; they are naked, without joints, and branching at the top, where are several large copper-coloured flowers, shaped like those of the Red Lily, and as large. These flowers never continue longer than one day, but there is a succession of flowers on the same plants for a fortnight or three weeks. It flowers in July and August.

Culture.—These plants are easily increased by planting the off-sets taken from the roots in autumn in any situation, as they are extremely hardy. They afterwards require no other culture, but to keep them clean from weeds, and to allow them room, that their roots may spread.

The first sort may also be increased by seeds, which should be sown in autumn. The plants

come up in the following spring, and these will flower in two years.

A moist soil and shady situation are the best suited to their growth; their size, and the great increase of their roots, especially in the second sort, render them most proper for large gardens and plantations, where they produce much variety and effect.

HEPATICA. See ANEMONE.

HERB, such a plant as rises with leaves and stalks annually from the root, the stalks not becoming woody or durable.

Many of the kitchen-garden esculents, and a great variety of ornamental or flowery plants, are of this kind. See HERBACEOUS PLANTS.

Many under-shrubby esculent and other plants are also sometimes considered as Herbs; such as sage, thyme, rue, hyssop, winter-savory, lavender, &c.: but these having ligneous, durable stalks and branches, more properly belong to the shrubby tribe.

HERBACEOUS PLANTS, such as have the properties of herbs.

All such as produce leaves and stalks annually from the root, and whose stalks or stems remain green and succulent, or soft, and do not become woody, or durable, but die down to the root every year, soon after they have produced flowers, &c. are properly of this sort, and of which there are annuals, biennials, and perennials.

They are thus very distinguishable from the woody kinds, such as trees, shrubs, and under-shrubs, whose stems and branches are woody or ligneous, and durable.

Of this class are most of the esculents of the kitchen-garden, except those of the under-shrubby kinds, such as sage, thyme, hyssop, &c. vast numbers of the flowery kinds for the pleasure-garden, almost all the annuals and biennials; as also all the perennials, both the fibrous, bulbous, and tuberous-rooted kinds, whose stalks decay annually.

HERMANNIA, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Monadelphia Pentandria*, and ranks in the natural order of *Columnifera*.

The characters are: that the calyx is a one-leaved perianthium, five-cleft, roundish, inflated: the little clefts bent in, permanent: the corolla pentapetalous, spiral against the sun: claws the length of the calyx, with a little membrane on each side converging into a cowed nectareous tube: border spreading, broadish, blunt: the stamina have five filaments, broadish, very slightly coalescing at bottom into one body: anthers upright, acuminate, converging: the pistillum is a roundish germ, five-sided, five-cornered: styles five, filiform, approximating, subulate, longer than the stamens: stigma simple: the

pericarpium is a roundish capsule, five-sided, five-celled, gaping at the top: the seeds very many, small, (kidney-form).

The species cultivated are: 1. *H. althæifolia*, Marsh-Mallow-leaved Hermannia; 2. *H. alnifolia*, Alder-leaved Hermannia; 3. *H. hyssopifolia*, Hyssop-leaved Hermannia; 4. *H. lavendulifolia*, Lavender-leaved Hermannia; 5. *H. grossularifolia*, Gooseberry-leaved Hermannia.

The first seldom rises more than two feet and a half high: the stem is not very woody, and the branches are soft and slender. The flowers are produced in loose panicles at the ends of the branches; are larger than those of the alder-leaved sort, and have hairy calyxes: they come out in June and July, and frequently again in the autumn. It is a native of the Cape.

The second species rises with a shrubby stalk six or eight feet high, dividing into many erect irregular branches, covered with a brown bark: the leaves narrow at their base, but broad and round at the top, about an inch long, and three quarters of an inch broad at the top: the flowers are produced in short spikes on the upper part of the branches; are of a pale yellow colour, and small; appearing in April and May.

The third rises with a shrubby upright stalk to the height of seven or eight feet, sending out many woody lateral branches, growing very erect: the leaves are about an inch and half long, and half an inch broad, serrate towards the end: the flowers come out in small bunches from the side of the stalk; are of a pale straw colour, appearing in May and June, and frequently followed by seeds, which ripen about the end of August.

The fourth species has shrubby branching stalks, which are very bushy, but seldom rise more than a foot and half high; the branches are very slender, and have hairy, pale-green leaves of different sizes; some of them two inches long, and an inch broad at their ends, but their common size is seldom more than one inch long, and half an inch broad; they are entire, and sit pretty close to the branches. The flowers come out from the side of the stalk singly, are small and yellow, continuing most part of the summer.

The fifth is a shrub of lower stature than the alder-leaved sort; but sends out a great number of branches, which spread wide on every side; the leaves are smaller than in that, rough and sessile: the flowers are produced in short close spikes at the end of every shoot, so that the whole shrub seems covered with them; they are of a bright yellow, and appear towards the end of April, but are not succeeded by seeds in this climate.

Culture.—These plants are all capable of being increased by planting cuttings of their young shoots in the early spring and summer months, in pots of good rich earth, plunging them in the first case in a moderate hot-bed, and giving them proper shade and water.

When they have stricken good root they should be removed with balls of earth about them into separate pots, filled with good light fresh earth, placing them in a shaded situation till perfectly re-established; when they should be exposed to the open air during the summer, but in the autumn and winter protected in the green-house, being deposited in an airy situation with myrtles and other similar plants.

They may likewise be raised from seed when it is good, here, or procured from abroad, by sowing it in pots of good mould, and plunging them in a hot-bed. The plants should be removed when of proper growth.

They afford ornament and variety among other potted evergreen plants.

HERNANDIA, a genus comprising plants of the evergreen exotic tree kind.

It belongs to the class and order *Monoecia Triandria*, and ranks in the natural order of *Tricoccæ*.

The characters are: that the male flowers are by pairs, lateral in each umbel: the calyx is a partial involucre, four-leaved, three-flowered: leaflets ovate, obtuse, spreading very much: there is no perianthium: the corolla has six petals, subovate, spreading; the three inner ones narrower: nectary, six glands, round-headed, placed round the filaments: the stamina consist of six filaments (three) shorter than the petals, inserted into the receptacle: anthers upright, oblong, large: female flower intermediate: the calyx is an involucre common with the males: perianthium inferior, one-leaved, bell-shaped, entire, permanent (inflated): the corolla has eight petals, of which four are interior and narrower, all sitting on the germ (petals six): the nectary has four glands, obovate, alternate with the interior petals: the pistillum is a roundish germ: style filiform: stigma oblique, somewhat funnel-shaped, large: the pericarpium is a dry drupe, ovate, eight-furrowed, one-celled, inclosed in a very large, inflated, roundish, fleshy, coloured perianthium, with the mouth entire: the seed is a globular nut, which is slightly depressed.

The species cultivated is *H. sonora*, Whistling Hernandia.

It is in its native situation an upright lofty tree, with an elegant head: the flowers are of a pale yellow colour, in paniced racemes; the calyxes of the fruit are yellow. It is common

in the West Indies, and there often termed Jack-in-a-box Tree.

The whistling noise which it produces is ascribed by Brown to the cups that sustain and partly envelop the nuts, which being large, as they move in the wind produce the sound.

Culture.—They are increased by sowing the seeds in a hot-bed in the spring. When the plants are two inches high, they should be transplanted each into a separate pot, filled with fresh rich earth, and plunged into the hot-bed again, observing to water and shade them until they have taken root; after which air should be admitted by raising the glasses, in proportion to the warmth of the atmosphere, and the heat of the bed, watering them frequently. As they advance they should be removed into larger pots, being careful not to break the roots, and to preserve a good ball of earth to them: when their leaves droop they should be screened from the sun until they have taken new root. They should be shifted in July, that they may be well rooted before the cold approaches. They must be kept constantly in the bark-stove; giving them in winter a moderate share of heat, and in summer plenty of air, when the weather is hot.

They produce a fine effect among other stove plants.

HESPERIS, a genus containing plants of the hardy herbaceous flowery kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliqueae*.

The characters are: that the calyx is a four-leaved perianthium: leaflets lanceolate-linear, from parallel converging, at top incumbent, at bottom gaping, deciduous: of these two opposite ones are gibbous at the base: the corolla is four-petalled, cruciform: petals oblong, the length of the calyx, a little bent back obliquely contrary to the sun's apparent motion, ending in attenuated claws, the length of the calyx: the stamina have six subulate filaments, the length of the tube; two of them shorter by half than the others: anthers linear, upright, reflex at the tip: an acuminate honeyed gland between each shorter stamen and the germ, and surrounding the stamen: the pistillum is a germ the length of the calyx, prismatic, four-cornered: style none: stigma two-parted, placed on the inside, oblong, upright, forked at the base, converging at the tip, withering: the pericarpium is a silique, long, pressed flat, stiff and straight, two celled, two-valved; the valves of the same length with the partition: the seeds very many, ovate, and compressed.

The species cultivated are: 1. *H. tristis*, Night-smelling Rocket, or Dame's Violet; 2. *H.*

matronalis, Garden Rocket, or Queen's Gilliflower; 3. *H. inodora*, Unsavoury Rocket.

The first has the leaves much larger than in those of the Garden Rocket, and of a paler green; the stalks are closely set with bristly hairs: the flowers grow in loose panicles at the top of the stalk, and appear about the same time with those of the second sort. It is a native of Austria, being much cultivated abroad for the great fragrancy of the flowers in the evening. In Germany pots of it are placed in the apartments of the ladies; whence it has the name of Dame's Violet.

The second species rises with an upright stalk a foot and a half high, with spear-shaped leaves which sit close to the stalk, and are slightly indented on their edges, ending in acute points: the flowers are produced in a loose thyrse on the top of the stalks: the petals are roundish and indented at the points, of a deep purple colour, and smell very sweet, especially in the evening or in cloudy weather. It flowers in June, and the seeds ripen the latter end of August. It is a native of Italy.

It varies with single purple flowers, with double flowers of both colours, and with a mixture of both.

The *Siberian* variety differs in having a stalk of twice the height: the corolla is purple, not white, and in the claws of the petals being twice as long as the calyx, and the border blunt, and scarcely, if at all, emarginate.

The third rises with an upright stalk near two feet high: the leaves are dark, green, and sessile: the flowers grow in loose spikes on the top of the stalks; in some they are white, in others purple, and sometimes both colours striped in the same flower. They have no odour. It resembles the second species so much as scarcely to be distinguished from it.

It varies with double flowers in both colours.

Culture.—They are increased either by seeds, offsets from the roots, or by cuttings of the flower-stalk.

The seed should be sown in a bed or border of light earth, and either raked in lightly, or covered a quarter of an inch deep with light mould in the early spring. When the plants are come up three or four inches in height, they should be planted out in beds six inches apart, to remain till autumn or the following spring, when they should be removed where they are to flower.

As most of these seedlings produce single flowers, and many of these go off after they have flowered, it is proper to raise a fresh supply annually.

The double sorts are propagated with certainty

only by dividing the roots, or by planting cuttings.

In the first method, in order to promote offsets from the root, some good plants should be allotted in any open bed or border for propagation, not suffering them to run up fully to flower; but when their flower-stalks have advanced about eight or ten inches high, to cut them down close to the ground; and as they shoot again, to cut them also off; as, by thus stopping their upright growth, the roots will more readily throw out young offsets from their sides, which will be well formed by the beginning of autumn, when the whole root should be taken up, and the offsets divided separately, and planted in a nursery-bed six inches distant, to remain till the beginning of autumn, or spring following; then removed with balls of earth about their roots to where they are to stand and flower.

The flower-stalks which are thus occasionally cut down to promote the increase of offsets at bottom, may be divided into lengths, and planted as directed below; each cutting will form a plant for flowering the following year.

This practice should be pursued annually to keep up the stock of double flowers; for those which shoot up to full growth and bloom rarely put out any offsets, unless the stalks are cut down as soon as the flowers begin to fade, when sometimes they emit a few, but which are not so numerous or so strong as in the manner directed above.

The cuttings of the flower-stalks may be planted any time in the early part of summer, when the stalks are advanced about a foot in growth, or before they flower, each being cut and divided into two or three cuttings, four, five, or six inches in length. The lower half generally forms the best cuttings. They should be planted in a shady border, putting them two parts into the ground, about three inches asunder, giving water at the time, and repeating it frequently. Many of the cuttings will be well rooted, and form shoots at top in six or eight weeks. To promote their rooting more effectually, they should be covered close with hand or bell glasses, as soon as planted, raising the glasses when they begin to shoot at top, to admit air, to which they should be hardened gradually.

All the sorts are ornamental for the open borders of pleasure-grounds, and to intersperse, in assemblage with other herbaceous plants, towards the fronts of the more conspicuous shrubby clumps, on sides of lawns and walks, being always planted out in autumn, or early in spring, before they advance much for flowering.

HIBISCUS, a genus furnishing plants of the shrubby and flowery exotic kinds.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a double perianthium: outer many-leaved, permanent: leaflets linear: more rarely one-leaved, many-cleft: inner one-leaved, cup-shaped, half-five-cleft, permanent: or five-toothed, deciduous: the corolla has five petals, roundish-oblong, narrower at the base, spreading, fastened at bottom to the tube of the stamens: the stamina have very many filaments, united at bottom into a tube, at top (in the apex and surface of this) divided and loose: anthers kidney-form: the pistillum is a roundish germ: style filiform, longer than the stamens, five-cleft at top: stigmas headed: the pericarpium is a five-celled capsule, five-valved: partitions contrary, doubled: the seeds solitary or several, ovate-kidney-form.

The species cultivated are: 1. *H. Syriacus*, Syrian Shrubby Hibiscus, or *Althæa Frutex*; 2. *H. Trionum*, Bladder Hibiscus, Bladder Ketmia, or Flower of an Hour; 3. *H. Rosa Sinensis*, China Rose Hibiscus; 4. *H. mutabilis*, Changeable Rose Hibiscus, or Martinico Rose.

The first rises with a shrubby stalk to the height of six or seven feet, sending out many woody branches, covered with a smooth gray bark: the leaves have the upper part frequently divided into three lobes, placed alternately on the branches, and stand on short foot-stalks: the flowers come out from the wings of the stalk at every joint of the same year's shoot; they are large, and shaped like those of the mallow, having five large roundish petals, which join at their base, spreading open at the top in the shape of an open bell: these appear in August, and if the season is not too warm, there is a succession of flowers part of September. The early flowers are succeeded by short capsules; but unless the season proves warm, they do not ripen in this climate. It is usually termed *Althæa frutex* by the nursery gardeners. It is a native of Syria.

There are varieties with pale purple flowers, with dark bottoms; with bright purple flowers, with black bottoms; with white flowers, with purple bottoms; with variegated flowers, with dark bottoms, called *Painted Lady Althæa frutex*; with pale yellow flowers, with dark bottoms; with variegated leaves, and with double flowers.

The second species rises with a branching stalk a foot and a half high, having many short spines which are soft: usually the leaves are divided into three lobes, which are deeply jagged

almost to the midrib; these jags are opposite, and the segments are obtuse; the flowers come out at the joints of the stalks upon pretty long peduncles; the outer calyx is composed of ten long narrow leaves, which join at their base; the inner is of one thin leaf, swollen like a bladder, cut into five acute segments at the top, having several longitudinal purple ribs, and is hairy; both these are permanent, and inclose the capsule after the flower is past: the flower is composed of five obtuse petals, which spread open at the top, and form an open bell-shaped flower; these have dark purple bottoms, but are of a pale sulphur colour above, tinged sometimes partially with pale purple on the outside, where they are also ribbed: the capsule is ovate, the consistence of paper, pustuled with protuberances occasioned by the seeds, villose and black. It is annual, growing naturally in Italy, &c. The flowers are of short duration, in hot weather continuing only a few hours open; but there is a succession of them daily for a considerable time, in June, July, and August. It has been long known by the title of Venice Mallow.

There are varieties with erect purplish stems, and the flowers larger, and their colour deeper; and with large paler-coloured flowers.

The third, in its native situation, grows to the size of an ordinary tree; but here it is shrubby, the stem round, erect, with alternate, spreading branches, that are wand-like, leafy, brownish-green, and nearly smooth: the leaves alternate, spreading, unequally and coarsely serrate, entire at the base, five-nerved, bright green, very smooth, except the young ones, which are slightly downy; their petioles are round, downy on the upper side: the stipules in pairs, opposite, at the base of the petioles, linear, acute, deciduous: the flowers axillary, solitary, peduncled, large, of a deep scarlet colour, resembling a double rose. It is common in China and the East Indies. It is rare with single flowers.

The fourth species has a pale stem, single, smooth, spreading out wide into leafy branches at top; the wood resembling that of the fig: the leaves are the same size with those of the vine, having the roughness of fig leaves, and the form of both, or rather of the angular leaves of ivy; whitish underneath: the petioles rough, thick, three or four inches in length: the peduncles thicker towards the top, sometimes tinged with red, sustaining large handsome flowers, which alter in their colour, as at their first opening they are white, then they change to a blush rose-colour, and as they decay they turn to a purple. Martyn remarks, that in the West

Indies all their alterations happen the same day; but that in England, where the flowers last near a week in beauty, the changes are not so sudden. It is a native of the East Indies, &c. The period of its blowing in the stoves of this climate is November and December.

It varies with double flowers, from which the single is frequently produced; but the seeds of the single seldom vary to the double kind.

Culture.—The first sort is increased by seeds, layers, and cuttings.

The seeds should be procured from abroad, and sown in pots filled with light earth in the early spring months, plunging them in a gentle hot-bed to bring them forward, or on a border in a warm exposure. They should be watered during the summer, and be protected from frost in the winter. When they have had two years' growth, they may be set out in nursery rows, or be planted where they are to remain.

The layers should be laid down in the autumn, the shoots being cut on the backs at one or two joints, and well laid into the ground. They are generally well rooted in twelve months, when they may be taken off and removed to where they are to remain.

The cuttings of the young shoots should be planted in pots of light earth in the early spring, plunging them in a mild hot-bed; or they may be planted in a shady border in the summer season. When well rooted, they should be carefully taken up and planted where they are to remain, either in the autumn or spring.

The second sort is increased by sowing the seed either in the autumn or spring, in the places where the plants are to flower, in patches of several seeds together. When they come up, they should be thinned out to two or three plants in each patch.

The two last sorts may be increased by sowing the seeds in the early spring months, in pots filled with rich light mould, plunging them in a moderate hot-bed under glasses, or, what is better, in the bark-bed of the stove. When the plants are up, and have attained two or three inches in growth, they should be removed into separate small pots, watering them well, and replanting them in the hot-bed, where they must be kept.

They may likewise sometimes be raised by planting cuttings of the young shoots in pots of the same sort of earth, in the spring or summer, giving them water, and plunging them in the bark hot-bed. They should afterwards be managed as the others.

The two first hardy sorts are highly ornamental in the borders and clumps, among other flowery plants; and the two last tender sorts

produce much variety by their beautiful flowers in the stove and conservatory collections.

HIERACIUM, a genus containing plants of the hardy, herbaceous, flowery, perennial kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Semiflosculosæ*.

The characters are: that the calyx is common, imbricate, ovate: scales several, linear, very unequal, longitudinal and incumbent: the corolla compound, imbricate, uniform: corollules hermaphrodite, numerous, equal: proper monopetalous, ligulate, linear, truncate, five-toothed: the stamens have five capillary filaments, very short: anther cylindric, tubulous: the pistillum is a subovate germ: style filiform, the length of the stamens: stigmas two, bowed back: there is no pericarpium: calyx converging, ovate: the seeds solitary, obtusely four-cornered, short: down capillary, sessile: the receptacle naked.

The species cultivated are: *H. aurantiacum*, Orange-flowered Hawkweed; 2. *H. chondrilloides*, Gum-Succory Hawkweed.

There are several other species that have been cultivated, but which possess little merit.

The first has perennial, creeping roots: the stem scarcely branched (except with the peduncles), bearded with white hairs placed on black glands, upright, a foot or a foot and a half in height (two feet high): the leaves next the root rather ovate, on the stem ovate-lanceolate or lanceolate, quite entire, dusky green, narrowing into the petiole, obtuse, alternate, the upper ones sessile; the lower ones a span long, and an inch broad: the stipules very small, lanceolate: the flowers eight or ten, orange-coloured, on short pedicels, forming a short panicle. It is a native of Austria, &c. flowering from June to autumn. It was formerly distinguished by the titles *Golden Mouse-ear*; and when of a dark colour, *Grim the Collier*.

It varies in the colour of the flower, from red to orange, and several shades of yellow.

The second species has the stem a span high, and even: the root-leaves petioled, smooth: stem-leaves five or six, alternate, long, with long recurved teeth: the peduncles from the upper axils of the leaves, the same height with the stem, solitary, almost naked, one-flowered. It is a native of the South of France, flowering in June and July.

Culture.—These plants are increased by sowing the seeds in the early spring, on a bed or border of fresh earth, in an eastern exposure. When the plants are a few inches high, they should be removed into other beds, to stand till the autumn, when they should be planted where they are to remain. But it is a better prac-

tice to plant them at first where they are to grow.

They may likewise be increased by planting slips of the roots in the autumn or spring where they are to remain.

In both modes they should be well watered when the season is dry.

The roots continue many years when planted in a soil that is not too rich or moist.

They afford variety in the fronts of the borders, clumps, and other parts of pleasure-grounds.

HIPPOPHAE, a genus furnishing plants of the hardy deciduous shrubby kind.

It belongs to the class and order *Dioecia Tetrandria*, and ranks in the natural order of *Cuculifloræ*.

The characters are: that in the male the calyx is a one-leaved perianthium, two-parted, two-valved, with the bottom entire; the parts roundish, blunt, concave, upright, converging at the tips, and gaping on the sides: there is no corolla: the stamens have four filaments, very short: anthers oblong, angular, almost the length of the calyx. Female—the calyx is a one-leaved perianthium, ovate-oblong, tubular, club-shaped, with the mouth cloven, deciduous: there is no corolla: the pistillum is a roundish, small germ: style simple, very short: stigma thickish, oblong, upright, twice as long as the calyx: the pericarpium is a superior berry, sub-globular, one-celled: the seed single, oblong, hard, shining.

The species are: 1. *H. rhamnoides*, Common Sea Buckthorn, or Sallow Thorn; 2. *H. Canadensis*, Canadian Sea Buckthorn.

The first rises with shrubby stalks eight or ten feet high, sending out many irregular branches, which have a brown bark silvered over: the leaves are narrow or linear-lanceolate, about two inches long, and a quarter of an inch broad in the middle, of a dark green on their upper side, but hoary on their under, with a prominent midrib; the borders are reflexed as in the rosemary; they are placed alternate on every side of the branches, and sit close to them; and there are little, clustered, peltate, ciliate, pale scales scattered over them: the branches spread wide, are straight, stiff, and thorny at the ends; the lesser ones numerous, scattered, short, and spreading: the flowers solitary, appearing before the leaves, generally abortive, unless the shrub grows in its natural situation: the male flowers below the leaves, between a branch and a one-valved, permanent bud, the length of the flower: the female flowers sessile in the axils of the lower leaves: the former are sub-sessile, somewhat spiked, disposed in four rows along the

lesser branches. The flowers come out from the branchlets of the former year; and the berries are abundant, on short peduncles, gratefully acid to the taste. It is a native of many parts of Europe, flowering from May to June. In sunny, sandy situations, it is planted for hedges; and it is used for dyeing yellow.

It varies with red berries.

The second species has the appearance of the first, but the leaves are broader, only half the length, of an ovate or oblong-ovate form; on the upper surface green, with diverging hairs, in bundles, scarcely to be discerned by the naked eye; on the lower, silvery with hairs and scales, and have rust-coloured dots scattered over them; the branches are opposite; and the racemes simple among the first leaves, upright, and shorter by half than the leaves. It is a native of Canada.

Culture.—These shrubs are easily propagated by planting suckers taken off from the roots in autumn, in the nursery. After they have had one year's growth, they are fit to plant out where they are to remain. They may also be increased by layers; but the roots spread and put up such abundance of suckers, that there is no necessity to be at this trouble.

They are also sometimes raised by planting cuttings of the young shoots as above.

As these shrubs have but little beauty, it will be sufficient to have one or two of them in plantations or borders.

HOE, an useful and well-known garden implement.

Hoes are of different kinds, as *Drawing* and *Scuffling Hoes*, and each sort has different sizes.

The first sort is fixed with its edge inward; the workman, in using it, draws it towards him. It is one of the most useful implements of gardening, for many purposes, both for general hoeing, and in drawing drills for sowing many sorts of seeds, loosening the earth about, and moulding up the stems of plants; and hoeing down weeds between all sorts of plants that stand distant enough to admit it. It is the best adapted of any for thinning out esculent crops to proper distances, to acquire their proper growth, such as onions, carrots, parsnips, turnips, spinach, &c.

Of this kind there should be three or four different sizes, from six inches width down to two inches.

The first size is a large Hoe for common use, about six inches long in the plate, by three or four broad, fixed on a long handle for both hands, and is the proper sort to use for all common hoeing work, and for drawing drills, for sowing peas, beans, kidney-beans, &c. with. It

is the most eligible sized Hoe of any for broad-hoeing between rows of all those kinds of plants, and all others that stand distant enough, either in rows or otherwise, for the Hoe to pass between them, both to cut down weeds and loosen the ground, and to earth up the stems of the plants, and for all other purposes of hoeing where the plants stand distant, both in the kitchen- and pleasure-garden.

The second size should be about four inches in the plate long-ways, and the same breadth as the above. It is useful for drawing drills, and for hoeing among various plants, where the former sort of Hoe cannot be commodiously employed; as well as to thin some sorts of esculent crops that require moderate distances; such as Dutch turnips, general crops of carrots, parsnips, &c. It is also a proper sized Hoe for hoeing common flower-beds and borders, &c. with.

The third size should be two inches and a half, or not more than three inches broad in the plate; and be fixed on a short handle to use with one hand in small-hoeing, thinning out several sorts of esculent crops, and other work among close-growing plants. A similar one should also be had fixed on a longer handle, to use two-handed in hoeing borders and other compartments of smaller plants, standing near together both in the kitchen-ground and flower-garden, &c. This sized hoe, on a short one-hand handle, is likewise particularly useful for small-hoeing, moulding, and thinning out many kitchen-garden crops in young growth; such as onions, leeks, carrots, parsnips, spinach, &c. to cut them out to the proper distances. It is also a very convenient size for use on many other occasions of hoeing; and for drawing small drills for sowing many kinds of seeds; and hoeing up flower-beds, &c. where the larger Hoes cannot be readily admitted between the plants, so as to stir the mould effectually.

The fourth size should be about two inches width, and fixed in a short handle. It is proper for small-hoeing onions and small crops of carrots, radishes, &c. the first time, where they stand pretty close, and where it is not designed to thin them out at once to their full distance, but to leave them rather thickish for culling, &c.

The edges of the Hoes should constantly be kept sharp by occasional grinding, that they may cut clean.

The second sort, or Scuffling Hoe, is commonly called a *Dutch Hoe*. It is fixed with the edge outward on the end of a long handle, so as that the person using it may push it from him, going backward, and never treading on the hoed

ground, as with the drawing hoe. In regard to size, it should be from about four to six or eight inches wide, open in the middle, for the mould and weeds to pass through, so as not to be drawn in heaps; having a long socket at the back part, in which to fix the handle, which may be five or six feet in length.

It is very proper for scuffling over any piece of ground to destroy weeds, that is clear from crops, or between crops that stand wide, with which a person may make considerably more expeditious work than with a drawing hoe, especially when the weeds are not suffered to grow large; in which case one man can often do as much as two with the other sort. It is not proper for hoeing out crops of esculent plants, or for earthing up the stems of plants, nor for hoeing where the plants stand close. But it is very useful for cutting down weeds in shrubberies and wilderness quarters, where the shrubs stand distant from one another. And it is the best sort of any for scuffling over sand-walks, or others made of loose materials, in order to destroy weeds, moss, &c.

In a small size it is also found useful to run over flower borders, to cut up straggling weeds; as, being fixed on a long handle, the work may be effected by standing in the walks, without treading on the borders or beds.

A sort of triangular Hoe has also been lately found very useful in hoeing many sorts of small crops.

HOEING, a necessary operation performed by the hoe, to destroy weeds, loosen the soil, and mould up the stalks or stems of plants.

It is an expeditious method of destroying weeds between all sorts of plants that stand distant enough to admit it.

When principally designed to destroy weeds, it should always be performed to some depth, and in dry weather, the more sunny the better, especially when the weeds are not to be raked off, that they may die as they are cut down, or at least be so much flagged or withered by the sun and air as not to grow again.

This sort of work, besides destroying weeds, is likewise useful in loosening the surface, and disposing the ground to receive the greater benefit from the air, dews, rains, &c. to the great nourishment of all sorts of plants, and, by breaking up the surface, dividing the clods, and stirring the earth, keeping it fresh, and proving a very beneficial culture to all vegetables. In soils apt to bind after much wet, which causes the plants to appear of a stunted growth, hoeing is of vast advantage in promoting their growth.

The application of earth about the stems of plants, such as earthing up rows of peas, beans, kidney-beans, cabbages, cauliflowers, &c. is

constantly of great service in promoting the strength and vigour of the crops, as well as in giving them a neat appearance.

It is also beneficial in thinning out many close-standing crops to proper distances, cutting out the superabundant plants and weeds, and loosening the soil.

HOLLOW ROOT. See **ADOXA** and **FUMARIA**.

HOLLY. See **ILEX**.

HOLLY, KNEE. See **RUSCUS**.

HOLLY, SEA. See **ERYNGIUM**.

HOLLYHOCK. See **ALCEA**.

HOLM OAK. See **QUERCUS**.

HOLM, SEA. See **ERYNGIUM**.

HONEY-FLOWER. See **MELIANTHUS**.

HONEYSUCKLE. See **LONICERA**.

HONEYSUCKLE, FRENCH. See **HEDYSARUM**.

HONEY-WORT. See **CERINTHE**.

HOODED WILLOW-HERB. See **SCUTELLARIA**.

HOP-HORN-BEAM. See **CARPINUS**.

HOPS. See **HUMULUS**.

HORN-BEAM. See **CARPINUS**.

HORN-BEECH-TREE. See **CARPINUS**.

HORNED POPPY. See **CHELIDONIUM**.

HORSE-BEECH. See **CARPINUS**.

HORSE-CHESNUT. See **ÆSCULUS**.

HORSE-RADISH. See **COCHLEARIA**.

HORSE-TAIL. See **EQUISETUM**.

HORSE-TAIL, SHRUBBY. See **EPHEDRA**.

HORSE-DUNG, that which is produced in the stable.

It is a material of great utility in garden culture, for the purpose of forming hot-beds for various early productions and tender plants, and afterwards as manure. See **DUNG** and **MANURE**.

This sort of manure is mostly of a littersy nature, from the great quantity of straw that is mixed and blended with the dung and urine of the horses. On this account it is more disposed to the production of heat, or the taking on the process of fermentation, than other sorts, and is of course better suited to the purpose of forming hot-beds with than any other.

For this use, it should be such as has remained together in the common dung-hill or heap till collected in proper quantity; and if it have commenced some fermentation, or become wholly, or in part, of a moist, warm, steamy quality, it is preferable. If, on turning it up with the dung-fork, it begins to assume a blackish appearance, not rotten, or exhausted and dry, but abounding in a fresh material substance, of a lively, moist, steamy warmth, it is in a good state for this purpose. Fresher dung

fall of moist, warm, steamy litter, is also very desirable, as it may be readily brought to a proper condition.

In this sort, it is the best method to throw it up, to gather and mix the different parts well before it is made use of in preparing the beds.

But for the purpose of manure it is more proper for most sorts of crops when it is more reduced, and brought into a soft, moist state.

HOT-BED, a sort of bed constructed for the purpose of producing artificial heat.

These beds are mostly formed either of horse-dung or tanner's bark, being raised two, three, or four feet high, and covered with garden-frames and glasses, &c.

It is by the aid of these beds that various tender plants, flowers, and fruits, are raised in perfection, which, without such artificial heat, could not possibly be produced or continued in this climate. By this means, likewise, vast numbers of seeds, which would otherwise remain years in the earth, and some never grow at all, are made to germinate, form plants, continue their growth, and produce their flowers and fruits, as in their native soils. And the cuttings and slips of many sorts of trees and shrubs, which would otherwise remain inactive and perish, are also made soon to emit root, fibres, and shoots, and become plants.

By this means, likewise, many valuable esculent plants that succeed in the full ground at one time of the year or other, are brought to perfection much sooner than they could otherwise be obtained, as the cucumber, asparagus, peas, beans, kidney-beans, radishes, carrots, strawberries, and various salad herbs, and other plants, which grow in the open ground.

Annual flowering plants, as well as those of the herbaceous and shrubby kinds, are also brought to more early perfection and flowering by them. They are therefore of great use in the practice of gardening.

Dung Hot-beds.—The proper situations for making these beds in are the forcing-ground, or other sheltered, warm, sunny exposures.

Hot-beds are sometimes made entirely on level ground, and sometimes in a trench or oblong cavity formed in the ground, the width and length of the intended bed, and from twelve inches to a foot and half deep or more; but for early work in winter or spring, they should be mostly above ground, upon the level rather elevated surface, that the bottom of the bed may stand dry, and not be liable to be chilled by wet, as, when made in this way in those seasons, when the heat declines, both sides of the bed may be lined with hot dung quite to the bot-

tom, so as the whole bed may have an equal benefit of the lining to revive its declining heat, which is essentially necessary during winter and spring, until the middle or latter end of May. But when Hot-beds are made in trenches at an early season, when linings must be added to support a constant regular heat, all that part of the beds within the ground is deprived of the advantage of them.

The forms and dimensions of dung Hot-beds should generally be that of long squares, ranging nearly east and west, to any length convenient; about four feet and a half broad, if to be covered with common garden-frames; and three and a half or four feet, if for hand-glasses; raising them, if in winter, or early in spring, three or four feet or more high, allowing for settling, as they will settle half a foot or more in a week or two's time after making. The early beds should be substantial, otherwise they will not support a durable uniform temperature of heat for continuing the plants in a regular, free growth; which, by aid of linings, must be effected till the arrival of warm weather. Those made in winter should be three feet and a half high, at least, when first made; or if four, the better; in March a yard high, in April the same, or two feet and a half, and in May two feet.

They may be made for a one-light, two-light, or three-light frames, and for two, three, or more three-light frames in a range, according to circumstances.

Forming the Beds.—After marking them out, some of the longest or most strawy dung should be shaken along the bottom, to begin the bed with; then the long and short together, as it comes to hand, shaking it evenly on every part, raising the sides perfectly upright, straight, and as firm as possible; forming the corners also full and very firm, keeping the middle well filled with the best dung; and, as the work advances, beating each layer of dung evenly and firmly down, with the dung-fork; or, when it is very long, loose, strawy dung, treading it in to settle every part equally; proceeding in this manner till the bed is arrived to its designed height, raising that intended for frames, two or three inches higher in the back or north side than in front, to give the greater slope to the glasses to the sun, finishing the top even in every part; and when the bed is thus raised, trimming up all the short dung remaining at last round the bed, laying it on the top ridgeways along the middle, which may either then, or rather, if a strong bed, in a few days after, when the bed has settled a little, be levelled, to make good all inequalities, and smooth the surface. After this, set the frame, &c. on, and earth the bed as

directed below. See FRAMES and HAND-GLASSES.

The Hot-bed being thus formed, when of considerable substance, it may be advisable to defer the framing and earthing it finally for several days, or a week or more, according to the strength of the bed, until a little settled, and the first violent heat has subsided; as the heat will be very strong, and frequently of a burning nature for the first week or two after it is made. It may, however, often be proper to set the frames and glasses on, to defend the bed from excessive rains or snow, as well as to draw up the heat sooner, to forward the bed to a proper temperature for the reception of the mould, and seeds or plants. The upper ends of the lights should be raised a hand's breadth high, or shoven so much down in dry weather, that the great steam arising may pass freely off; as in strong Hot-beds neither the earth, seed, or plants, should be put in till the fierce heat and violent steam have a little abated. Hot-beds of slender substance may, however, be framed, earthed, &c. as soon as made, as no great danger is to be apprehended from burning, and more particularly those for small frames, hand-glasses, &c.

Where there is an extensive range of substantial Hot-beds, the placing the frames on them before they are fixed for good, is often inconvenient; in which case it is proper to have mats, or dry long litter, ready to cover the tops in case of excessive rains or snow, which might chill and retard the beds greatly from becoming of a due temperature for the reception of the earth, &c. and sometimes occasion them to become of a burning quality, when they otherwise would be of a regular heat.

In Hot-beds designed for strength and duration it will, as soon as they are made, be proper to provide some sharp-pointed sticks, two feet long, to thrust down into the middle of the beds in different parts, that by pulling them out daily, and feeling their lower parts, a judgment may be formed of the working and temperature of the beds, and when in a proper state for the reception of the mould and plants.

When the Hot-bed is therefore of good substance, and for the large frames, it is proper to let it remain some days to settle, before it is framed for good, because, notwithstanding all the care in making, it will often settle unequally, and should be levelled before it is earthed; in from about three to five, six, or eight days, according to the nature of the dung, or substance of the bed, it will have so far settled as to discover the inequalities, if any; when, if the frames and glasses were placed thereon for the purposes

above mentioned, when the whole has settled, all the inequalities should be made even by levelling the top, making the surface firm, and smoothing it off neatly with the back of the spade. Then the frame and glasses should be put on for good, opening the lights a little at top to give vent to the steam.

Earthing the Beds.—As substantial dung Hot-beds, after being covered with the frames, &c. sometimes heat violently the first week or fortnight, when the earth is put in during the fierce heat, by confining the heat and steam still more closely, it is in danger of being burnt, and also of destroying the seed and roots of the plants, if any were sown or planted. When the earth is thus burnt by the heat of the dung, no seeds or plants can vegetate or thrive in it; it must therefore be taken out, and be replaced by fresh compost. Hot-beds of considerable substance should of course be examined previous to moulding them, to ascertain the state of heat daily, both by the sticks, and thrusting the hand down into the dung. And when it is found of a due temperature, the mould should be put on. This is sometimes shown to be the case by the appearance of a sort of mushroom spawn.

But in slender Hot-beds, as their heat is never so violent or durable, they may either be earthed as soon as made, or in two, three, or four days afterwards, as judged proper. In all cases care should however be taken that the beds do not lose any time, for them to waste their heat ineffectually, without being earthed.

For all sorts of Hot-beds the earth or mould should be rich, light, and of a dry quality, particularly for early work in winter and spring, and tender plants, such as cucumbers, melons, tender annuals, &c. as very moist earth rots such plants while young, binds too close, and by its compactness confines the heat and steam, so as often to burn at bottom, and scorch the roots of the plants. Some light mould should therefore be always in readiness in some airy shed, for two or three weeks before it is wanted. See COMPOST.

The depth of earth or mould necessary to be applied over Hot-beds, must be different according to the purposes for which they are designed, as for sowing seed on, or the reception of plants, and the nature of the plants, or chiefly for plunging pots in. In general, however, from about five or six, to ten or twelve inches, is the common depth. For sowing seeds to raise plants for transplantation, the depth of mould should be about six inches; and where they are to remain to acquire their full growth, not less than from six or eight to

ten or twelve inches in depth. If for the immediate reception of plants, to remain, or for striking cuttings of any sort in, &c. from six to eight, ten, or more inches of mould will be necessary; regulating the whole in some proportion to the nature or growth of the plants, and the substance of the beds. Thus, cucumbers and melons, which are not only extensive growers, but produce large fruit that requires much nourishment, need a greater depth of mould than small salad-herbs, &c.

In earthing the beds, every part of the dung within the frame should be carefully covered over, especially after the plants are come up, or any planted, that no steam may rise immediately from the dung upon them.

In regard to sowing or planting seeds or plants in Hot-beds of strong substance, under frames, care should be taken not to do it till the danger of burning is over, unless performed in pots, that may be moved up as occasion requires; and at any rate it is always better to wait a day or two, than to endanger burning the plants; time should not however be lost when the bed is ready, as it is necessary always to have a lively heat at first, to promote a quick germination in the seeds, or to strike and set the plants forward so as to assume a free growth at first.

In the management of Hot-beds after being sown or planted, it must often be different, according as the different plants may require. In general, however, after the seeds or plants have been put in, the glasses are to be continued constantly on until the middle of summer, when the weather is become settled and warm, particularly for all the tender kinds of plants; fresh air being admitted daily, at all opportunities, in mild weather, by raising the upper ends of the lights; or, if hand-glasses, by propping up one side, from about half an inch to two or three inches high, according to the heat and steam in the bed, and temperature of the outward air, shutting all close in due time towards evening, and keeping them close every night during the cold weather, covering the glasses every night with mats until June, especially for the more tender sorts of plants.

When the heat of the beds naturally declines or becomes of a weakly temperature, it must be renewed by adding fresh hot dung around the sides, which is called lining the bed, and is particularly necessary for all dung hot-beds, made any time in winter or spring. See LINING.

Sometimes a repetition of new linings is required three or four times, especially for those made in winter, to continue them in a uniform heat; these linings should be made of the hottest dung, and be applied quite from the bottom to

the top of the bed, and about fifteen or eighteen inches wide at bottom, drawing them into about a foot wide at top, raising them four or five inches up the frame, to allow for settling, but not more; for the top of the linings, when settled, should be but very little above the bottom of the frame, lest their heat burn the earth adjoining to the frame within: and to prevent steam from rising too copiously from the linings, a stratum of earth should be laid on the top, two inches thick, continuing it close up to the bottom of the frame, that no steam may rise that way; for the rank steam immediately from dung, without first passing through a body of earth, is destructive to most plants. As the lining settles down lower than the top of the bed, more fresh dung should be added.

Bark Hot-beds.—These are Hot-beds formed of bark or tan, after having been used in tan-vats or -pits, which produces a regular, moderate, and durable heat. See BARK.

Hot-beds of this kind always require to be made in proper bark-pits formed for the purpose of brick-work, or post and planking, to confine the tan in its proper situation. See BARK-PIT.

Where there are proper conveniences of pits, in which to make the hot-beds furnished with frames and glasses suitable, they are superior in many cases to dung Hot-beds, both in raising many early esculent productions, and various curious flowers to early bloom, as well as in the propagation and raising many sorts of tender exotics, from seeds, layers, cuttings, &c. In bark Hot-beds early strawberries and melons may be raised, which, by the regular, moderate, and durable heat which they produce, are generally obtained in great perfection at an early season; likewise, small early crops of dwarf-peas and kidney-beans, &c. and of flowering plants, many sorts may be forced in great perfection of early bloom, both of the bulbous, tuberous, and fibrous-rooted kinds, such as hyacinths, dwarf tulip, jonquils, narcissuses, anemones, ranunculuses, pinks, and many other moderate-growing kinds; also roses, and some other small ornamental flowering shrubs.

Bark Hot-beds are also of great utility in hot-houses, stoves, and forcing-houses, as the principal and most proper and effectual kind of beds for these different departments. See BARK-BEDS.

Forced Crops.—The sorts of crops usually raised in these hot-beds are cucumbers, melons, asparagus, strawberries, kidney-beans, peas, dwarf-beans, radishes, small-salad herbs, and lettuces. And various sorts of seed plants are raised and preserved in this way, such as cauliflowers, early cabbages, red cabbages, early celery, plants

for pricking out, carrots, small white turnip-radishes, Dutch turnips, mint, tarragon, tansey, basil, capsicums, love-apples, coriander, purslane, early dwarf potatoes, and mushrooms, in a bed of a peculiar sort. But those for which these beds are absolutely necessary are all the first sort, and basil, capsicum, love-apple, and mushrooms.

HOT-HOUSE, a sort of garden-erection, mostly formed of glass-work, in which a constant, regular degree of artificial heat by fire and bark hot-beds is kept up.

It is made use of for procuring some sorts of fine fruits, such as the pine-apple, and for raising and preserving various sorts of tender exotics from the hot parts of the world.

In the construction of these houses, a wall of eight or ten feet high or more, is raised behind, with a low wall in front and both ends, on which is placed upright glass-work, four, five, or six feet, and a sloping glass roof, extending from the top of the front to the back wall. Internal flues for fire-heat, in winter, are also contrived, and a capacious oblong or square pit in the bottom space, in which to have a constant bark-bed to furnish a continual regular heat at all seasons; so as in the whole to warm the inclosed internal air always to a certain proper high degree.

Besides the above, these Houses are of great utility in forwarding many sorts of choice or desirable hardy plants, flowers, and fruits, to early perfection, which being sown or planted in pots, and placed in them in winter, or early in spring, the constant heat thus produced forwards them to maturity two or three months or more before their natural season in the full ground; such as kidney-beans, strawberries, &c.: also many sorts of flowering plants, both annuals and perennials, of moderate growth, are forwarded to early bloom; and vines planted in the outside, close to the front, the stem of each introduced through a small hole above, and the internal branches trained up under the glasses, produce grapes at an early period, as in May. In Hot-houses, likewise, early cucumbers may be raised in good perfection; and the seeds, cuttings, slips, &c. of many curious tender plants forwarded exceedingly in their growth, by plunging the pots containing them in the bark-bed. See **STOVE**.

These Houses are mostly ranged lengthways nearly east and west, that the glasses of the front and roof may have the full influence of the sun. This is the most convenient situation for common Hot-houses, either for pines or other exotics.

Some Houses of this sort, instead of being placed in this direction, have lately been rang-

ed directly south and north, having a sloped roof to each side like the roof of a house; also to the front or south end; both sides and the south end front being of glass. These Houses are made from ten or twelve to fifteen or twenty feet wide, the length at pleasure; and from ten to twelve feet high in the middle, both sides fully head height; being formed by a brick wall all round, raised only two or three feet on both sides, and south end; but at the north end like the gable of a house. Upon the top of the side and south end walling is erected the framing for the glass-work, which is sometimes formed two or three feet upright, immediately on the top of the wall, having the sloped glass-work above; and sometimes wholly of a continued slope on both sides, immediately from the top of the side walls to that of the middle ridge. They are furnished either with one or two bark-pits; but if of any considerable width, generally with two ranging parallel, one under each slope of the top glass, separated by a two-feet path running along the middle of the House, and sometimes continued all round each pit, with flues ranged along against the inside walls; the whole terminating in an upright funnel or chimney at the north end.

Other Hot-houses are formed entirely square, having a ten- or twelve-foot brick wall behind; that of the front and both sides, only two or three feet high for the support of the glass-work, placed upright nearly the same height, and sloped above on both sides and front, which are wholly of glass. These are furnished within with bark-pits and flues, as in the others.

In particular cases they are likewise made semicircular, or entirely circular, being formed with a two or three feet brick wall supporting the glass framing, which is continued quite round; having the bark-pit also circular, and flues carried all round the inside of the walling, terminating in a chimney on the northern side.

The first forms are probably the best for general purposes.

Hot-houses on these plans are made of different dimensions, according to the sizes of the plants they are designed to contain; but for common purposes they should be only of a moderate height, not exceeding ten or twelve to fourteen feet behind, and five or six in front: some are, however, built much more lofty behind, to admit of the taller growing exotics placed towards the back part, to grow up accordingly in a lofty stature; but the above are best adapted to the culture of pines, and other moderate growing plants, as well as for forcing in; as very lofty houses require a greater force of heat, and by

the glasses being so high, the plants receive less benefit from the sun, and are apt to draw up too fast into long slender leaves and stems, as they naturally tend towards the glasses. Where the top glasses are of a moderate distance from the plants, they receive the benefit of the sun's heat more fully, which is essential in winter, and become more stocky at bottom, and assume a more robust firm growth, particularly the pineapple, and are thereby more capable of producing large fruit.

After having determined on the dimensions as to length and width, the foundations of the walls should be set out accordingly of brick-work, allowing due width at bottom to support the flues a foot wide, wholly on the brick bases; detached an inch or two from the main walls; then setting off the back or north wall a brick and a half or two bricks thick, and the front and end walls nine inches, carrying up the back wall from ten to fourteen feet high; but those of the front and ends only from about two feet to a yard; taking care, in carrying up the walls, to allot a proper space for a door-way, at one or both ends, towards the back part; setting out also the furnace or fire-place of the flues in the bottom foundation, towards one end of the back wall behind, formed also of brick-work, made to communicate with the lowermost flue within. But when of great length, as forty feet or more, a fire-place at each end may be necessary; or, if more convenient, may have them in the back part of the end walls, or both in the middle way of the back wall; each communicating with a separate range of flues; in either case, forming them wholly on the outside of the walls, about twelve or fourteen inches wide in the clear, but more in lengthways inward; the inner end terminating in a funnel to communicate internally with the flues, fixing an iron-barred grate at bottom to support the fuel; calculated for coal, wood, peat, turf, &c. An ash-hole should be made underneath. The mouth or fuel door should be about ten or twelve inches square, having an iron frame and door fixed to shut with an iron latch as close as possible. The whole furnace should be raised sixteen or eighteen inches in the clear, finishing the top archways. Then continue carrying up the walls of the building regularly, and on the inside erect the flues close along the walls.

It is sometimes advantageous to have the flues a little detached from the walls, one, two, or three inches, that, by being thus distinct, the heat may arise from both sides, which will be an advantage in more effectually diffusing the whole heat internally in the house; as, when they are attached close to the walls, a very considerable

portion of the heat is ineffectually lost in the part of the wall behind. In contriving the flues, they should be continued along the front and both ends, in one range at least, in this order. But it is better if they be raised as high as the outward front and end walls, in one or two ranges, one over the other. On the tops of these may be placed pots of many small plants, both of the exotic and forcing kinds.

Thus proceed in the construction of the flues, making them generally about a foot wide in the whole, including six or eight inches in the clear, formed with brick-work, on edge; the first lower flue should communicate with the furnace or fire-place without, and be raised a little above it, to promote the draught of heat more freely, continuing it along above the intended level of the floor of the back alley or walk of the house the above width, and three bricks, on edge, deep, returning it in two or three ranges over one another, next the back wall, and in one or two along the ends, and front wall, as the height may admit; each return two bricks, on edge, deep, and tiled or bricked over. In the beginning of the first bottom flue a sliding iron regulator may be fixed, to use occasionally, in admitting more or less heat, being careful that the brick work of each flue is closely jointed with the best sort of mortar for that purpose, and well pointed within, that no smoke may break out; having each return closely covered with broad square paving tiles on the brick-work; covering the uppermost flues also with broad, thick, flat tiles, the whole width, all very closely laid, and joined in mortar. The uppermost or last range of flues should terminate in an upright vent or chimney at one end of the back wall; and where there are two separate sets of flues, there should be a chimney at each end. An iron slider in the termination of the last flue, next the chimney, may also be provided, to confine the heat more or less on particular occasions.

Sometimes, in very wide houses, in erecting the flues, to make all possible advantage of the fire-heat, one or more spare flues, to use occasionally, is continued round the bark-pit, carried up against the surrounding wall, but detached an inch or two, to form a vacancy, for the heat to come up more beneficially, and that by having vent, it may not dry the tan of the bark-bed too much; and in the beginning a sliding iron regulator may be fixed, either to admit or exclude the heat, as expedient; so that the smoke, by running through a larger extent, may expend its heat wholly in the flues before it is discharged in the chimney.

Great care must likewise be taken that neither

the fire-place or flues be carried too near any of the wood-work.

After this, proceed to set out the cavity for the bark-pit, first allowing a space next the flues for an alley or walk, eighteen inches or two feet wide all round, and then in the middle space form the pit for the bark-bed, six or seven feet wide, the length in proportion to that of the House, and a yard or more deep; inclosing it by a surrounding wall. It may either be sunk at bottom a little in the ground, raising the rest above, by means of the parapet wall; or, if there is danger of wet below, it should be raised mostly above the general surface. The surrounding wall should be nine inches, but a brick-wide wall is often made to do, especially that part which forms the parapet above ground. It should be coped all round with a timber plate or kirk, framed and mortised together, which effectually secures the brick-work.

The bottom of the pit should be levelled and well rammed, and if paved with any coarse material, it is an advantage in preserving the bark. And the path or alley round the pit must be neatly paved with brick or stone.

The glass-work for inclosing the whole should consist of a close-continued range of glass sashes all along the front, both ends, and roof, quite up to the back wall; each sash being a yard, or three feet six inches wide; and for the support of which, framings of timber must be erected on the brick-walling, conformable to the width and length of the sashes.

For the reception of the perpendicular glasses in the front and ends, a substantial timber plate must be placed along the top of the front and end walls, upon which should be erected uprights, at proper distances, framed to a plate or crown-piece above, of sufficient height to raise the whole front head high, both ends corresponding with the front and back; a plate of timber being also framed to the back wall above, to receive the sloping bars from the frame-work in front; proper grooves being formed in the front plates below and above, to receive the ends of the perpendicular sashes, sliding close against the outside of the uprights all the way along the front, or they may be contrived for only every other sash, to slide one on the side of the other.

And from the top of the upright framing in front should be carried substantial cross-bars or bearers, sloping to the top of the back wall, where they are framed at both ends to the wood-work or plates, at regular distances, to receive and support the sloping glass sashes of the roof, when placed close together upon the cross bars or rafters, and generally ranging in two or more

tiers, sliding one over the other, of sufficient length together to reach quite from the top of the upright framing in front, to the top of the back-wall. The cross bars should be grooved lengthways, above, to carry off wet falling between the frames of the sloping lights; making the upper end of the top tier of glasses shut close up to the plate in the wall behind, running under a proper coping of wood or lead, fixed along above close to the wall, and lapped down of due width to cover, and shoot off the wet sufficiently from the upper termination of the top sashes. Some wide Houses have, exclusive of the main slope sliding glass sashes, a shorter upper tier of glass fixed; the upper ends being secured under a coping as above, and the lower ends lapping over the top ends of the upper sliding tier, and this over that below in the same manner, to shoot the wet clear over each upper end or termination; likewise along the under outer edge of the top plate, or crown-piece in front, may be a small channel to receive the water from the sloping glass sashes, and convey it to one or both ends without running down upon the upright sashes, being careful that the top part behind be well framed and secured, water-tight, and the top of the back wall finished a little higher than the glasses, with a neat coping the whole length.

The bars of wood which support the glasses should be neatly formed, and made neither very broad or thick to intercept the rays of the sun. Those, however, at top, should be strong enough to support the glasses without bending under them. In wide Houses uprights are arranged within at proper distances, to support the cross rafters more perfectly.

In respect to the glass work in the sloping sashes, the panes of glass should be laid in putty, with the ends lapping over each other about half an inch; the vacancies of which are in some closed up at bottom with putty, others leave each lapping of the panes open, in order for the air to enter moderately, and that the rancid vapours arising from the fermentation of the bark-bed; &c. within, may thereby be kept in constant motion without condensing much; and also that such as condense against the glasses, may discharge itself at those places without dropping upon the plants. The upright sashes in front may either be glazed as above, or the panes laid in lead work; being very careful to have the glazing well performed, and proof against wet.

The doors should have the upper parts sashed and glazed to correspond with the other glass-work.

On the inside the walls should be plastered,

plastered, and white-washed; and all the wood-work within and without, painted white in oil colour.

Ranges of narrow shelves for pots of small plants may be erected where most convenient, some behind, over the flues, a single range near the top glasses towards the back part, supported either by brackets suspended from the cross bars above, or by uprights erected on the parapet wall of the bark-pit. A range or two of narrow ones may also be placed occasionally along both ends above the flues.

In wide Houses, where the cross-bars or bearers of the sloping or top glass sashes appear to want support, some neat uprights, either of wood or iron, may be erected upon the bark-bed walling, at convenient distances, and high enough to reach the bearers above.

On the outside behind should be erected a close shed the whole length, or at least a small covered shed over each fire-place, with a door to shut, for the convenience of attending the fires; but the former is much the best, as it will serve to defend the back of the Houses from the outward air, and to stow fuel for the general use of them, also for garden-tools, and all garden utensils when not in use, to preserve them from the weather; as well as to lay portions of earth in occasionally, to have it dry, for particular purposes in winter and early spring.

Sometimes Hot-houses are furnished with top covers, to draw over the glass sashes occasionally, in time of severe frosts and storms; and sometimes by slight sliding shutters, fitted to the width of the separate sashes; but these are inconvenient, and require considerable time and trouble in their application. At other times they are formed by painted canvass, on long poles or rollers, fixed lengthways along the tops of the Houses, just above the upper ends of the top sashes, which, by means of lines and pulleys, are readily let down and rolled up.

In the annexed plate is contained the front elevation and ground plan of an improved House of this sort, which has been found to answer well in practice.

Fig. 1. Front elevation.

Fig. 2. Ground plan.

Fig. 3. Section.

A plan for another kind of improved Hot-house has been suggested by Dr. James Anderson, for which he has taken out a patent. It produces its effects chiefly by the heat of the sun, without the aid of flues, tan-bark, or steam. This improvement extends to every sort of Hot-house; and the advantages of such Hot-houses are, according to the statement of the doctor,

1st. That "in every kind of temperature, if the works are to be erected new from the foundation, few cases can occur in which they may not be so placed as that the *whole* heat required may be obtained without occasioning the expenditure of *one shilling* for fuel; but in the most unfavourable cases that can occur, the expenditure of fuel will *not* amount to *one tenth* part of what is now universally employed for producing similar effects."

2d. That "in a Vinery, for example, where the grapes are not meant to be forced farther than to ripen from the middle of June to the end of July, as the season may be, no fuel will in any case be required, the whole effect being produced by the heat of the sun alone."

3d. That "where the grapes are to ripen in April or May, some artificial heat will be wanted; but the quantity of fuel, even in this case, will be so inconsiderable, that in a house which produces, on an average of years, under ordinary good management, not less than *ten thousand* full-sized bunches of grapes, and fifteen hundred pots of strawberries, or other such plants, the consumption of fuel will not exceed *half a London chaldron of coals*; and so in proportion for those of larger extent."

4th. That "in the Pinery and Stove the expenditure of fuel will be diminished in a proportionate degree; while, at the same time, the use of *bark* (or of *steam*, as a substitute for the heat of *tan*) will be entirely dispensed with; which, in many situations, will be the saving of much expense."

5th. That "these savings of expenditure will be effected not only without any detriment to the pines and other plants, but with great advantage to them all; for, in consequence of these improvements, those diseases which so much weaken and often destroy the most valuable plants, the damp in particular, will be entirely removed, and vermin in a great measure annihilated; the plants too, in consequence of the ventilation that may be at all times given them at pleasure to any degree that shall be thought proper (without varying the temperature from that degree which may be deemed most salutary to the plants, at the same time that it may be changed at will from moist to dry, or the reverse), may be kept in a state of perpetual health and luxuriance that has been hitherto unknown in these repositories." And,

6th. That "all these effects will be produced by such a simple apparatus, and that so adapted as to moderate of itself extremes of every sort, that it will become a matter of much less nicety and trouble to the gardener than at present; as he may safely be absent for a much longer time,

and thus the accidents which originate from negligence less frequently occur."

These houses are made almost wholly of wood and glass. The base is a frame of wood, which rests horizontally upon posts fixed firm in the ground, to which the frame is screwed by strong iron screws; the whole being so constructed as to admit of being taken down and removed at pleasure without violence, merely by undoing the screws. They are capable of being formed of any dimensions. A full explanation of their nature, and the principles on which they produce their effects, may be seen in the doctor's work on the "Patent Hot-house."

Hot-houses on this plan are constructed by George Byfield, esq. architect, Craven-street, Strand, London; and Mr. Samuel Butler, Hot-house-builder, Little Chelsea.

Nursery and Succession Houses.—In addition to these Hot-houses, others of smaller dimensions, for striking and raising the young plants in, and as Succession Houses for receiving them into afterwards, when of a year's growth, to bring them forward to a proper size for being used as fruiting plants, are necessary, especially where the pine-apple is cultivated upon an extensive scale, in order to afford full room in the large Houses for the fruiting plants.

These Houses may be erected either as appendages to the main house, or detached at a little distance, as most convenient. When the situation admits, it is however more convenient and ornamental to join them in a line with the main House, one at each end. They are formed nearly of the same construction, only smaller both in length, width, and height.

Nursery-House.—This is sometimes formed in the manner of a common detached bark-pit, without any upright glasses in front, having a wall all round, five or six feet behind, gradually sloping at each end, to about four feet in front, and with only sliding glasses at top. Its dimensions must vary according to the extent of plants. It is often termed simply the pit, as the whole internal space in length and width is allotted entirely as a pit for a bark-bed, without any walk within, or door for entrance, the necessary culture being performed by sliding open the glasses at top, the flues for the fires being formed in the upper part of the back wall, above the surface height of the bark-bed. They may, however, be formed in the manner of the Houses.

Succession House.—This should be constructed with erect glasses in front, and sloping sashes at top, with a door for entrance, and an alley or walk next the back wall; or, what is better, continued round the bark-pit. And where joined to the end of the House, it may be di-

vided from it by a sliding glass partition, having a separate furnace and flues, as the young pine plants do not at all times require the same degree of fire-heat as the older pines. The dimensions must vary according to circumstances and the number of plants. See STOVE and GREEN-HOUSE.

HOT-HOUSE PLANTS, such of the tender exotic or other kinds as require this sort of house for their growth, protection, and preservation in this climate. See STOVE PLANTS.

HOT-WALL, a range or extent of brick or stone walling, fronted with glass-work, so as to inclose a space of several feet in width, constructed with internal fire-flues, &c. designed for forcing fruit-trees to early production.

Walls of this nature are mostly ranged lengthways, east and west, to front the full sun; having the south side, or that exposed to the sun, covered by a frame-work of glass, the whole length and height, including a space of but moderate width, as four, five, six, or eight feet, for one row of trees behind, trained in the wall-tree order, and extended from twenty or thirty, to forty, fifty, or a hundred feet in length; or of greater width, as ten, twelve, or fifteen feet, in the forcing-house manner, to admit of a range of trained trees behind, and others of lower growth forward; and, in either having internal flues for fire-heat in the main wall, and continued round along towards the front glass, or sometimes ranged longitudinally along the middle space. Some Hot-walls have likewise the front inclosure of glass-work, of sufficient width to admit of forming an internal pit, from four to five or six feet in width, the length of the erection; in which to make a bark-bed, or sometimes a dung hot-bed, or occasionally dung below, and bark above, to assist, in conjunction with the fire heat of the flues, in warming the internal air.

In either method, a border of good mellow, loamy, or other fertile earth, of proper width, is formed against the main wall, in which to plant the trees. Where there is no bark-bed, the whole bottom space is formed of good earth, having a narrow inclosure of glass, four, five, or six feet, to have only a range of trees next the wall, trained as wall-trees, or espaliers; or sometimes made wider, to have wall trees behind, trained to the height of the wall, and others trained in lower growth, in the internal space forward, either in the espalier manner, or as small dwarf-standards, or sometimes as horizontal dwarfs. See DWARF TREES.

When these are made of wide dimensions, either to admit of a bark-pit, or to have the whole internal bottom space of earth with trees

against the wall, and others planted forward between these and the glasses, they may properly be considered as forcing-houses.

In proper Hot-walls, as such as have narrow inclosures of glass from four to five or six feet in width, containing only one range of trees, they may be trained towards the wall upon trellis-work, where there is a range of flues immediately next the wall; but where all the flues are ranged forward, the trees may be trained close to the wall. See FORCING FRAME.

In the annexed plate is seen the ground-plan, section, and elevation of an improved wall of this kind, in which fig. 1. is the ground plan, fig. 2. longitudinal section, and fig. 3. transverse section.

HOUND'S-TONGUE. See *CYNOGLOSSUM*.

HUMBLE PLANT. See *MIMOSA*.

HUMULUS, a genus containing a plant of the hardy twining perennial kind.

It belongs to the class and order *Dioecia Pentandria*, and ranks in the natural order *Scabridæ*.

The characters are: that in the male the calyx is a five-leaved perianthium: leaflets oblong, concave, blunt: there is no corolla: the stamina have five capillary filaments, very short: anthers oblong: in the female the calyx is an universal involucre, four-parted, sharp: partial four-leaved, ovate, eight-flowered: to each flower a perianthium, one-leaved, ovate, very large, outwardly flat on one side, converging at the base: there is no corolla: the pistillum is a very small germ: styles two, subulate, patulous: stigmas sharp: there is no pericarpium: calyx inclosing the seed at the base: the seed roundish, covered with a coat.

The species is *H. Lupulus*, the Hop.

It has a perennial root: the stems weak and twining, not climbing by tendrils, but ascending a prop, trees or shrubs in a spiral, always with the sun, that is, from right to left, or from east to west by the south: these stems are angular, striated, and rugged, with very minute prickles: the leaves opposite in pairs (or sometimes in threes), the upper ones heart-shaped, the lower three-lobed (or sometimes five lobed), serrate, dark green above, pale green beneath, on long petioles; which, as well as the leaves themselves, are rugged with minute prickles: the stipules two or four, cordate, bifid at each joint: the flowers greenish yellow; the males on branched peduncles; the females on a distinct plant, peduncled, in pairs, in form of a cone or strobile, composed of ovate, membranaceous scales, tubular from being rolled in at the base, and two-flowered, each containing one (sometimes two) seed, of a brown bay co-

lour, of a globular form a little flattened, surrounded with a sharp rim, and compressed at the tip. It is a native of most parts of Europe, flowering in June.

There are Hop plants, which bear male flowers only, growing in long clusters; and Hop plants which bear female flowers only, produced in roundish, scaly, leafy clusters. The latter is the only sort cultivated, and which the Hop planters distinguish into, Early White, Long White, Oval, and Square Garlick Hops.

Culture. These plants are increased by cuttings of the suckers immediately from the roots within the earth, every part of which will grow, making them six or seven inches long, each having three or four buds or eyes, for emitting shoots. They may be taken from the roots of the plants of any old plantation. Care should be taken to choose good sorts, and such as are good bearers, trimming each set from all parts of the old vine, and any hollow or bad part.

They may also be propagated by layers of the young shoots in summer, cutting off their tops at the time of laying; they will soon root and form sets for next spring.

The plants or sets should be all of a sort, not early, middle, and late kinds planted together, which, by ripening at different times, would occasion great trouble in gathering the produce.

The Early White Hop, which comes first, is a fine Hop, but an indifferent bearer. The Long White Hop comes next, and is a good bearer. The Square Garlick Hop comes latest, but is a plentiful bearer, though a coarser Hop than the others.

The ground for this purpose should be well dug over, and rendered perfectly fine in the mould, as well as smooth and level on the surface.

When the land is thus prepared, having the sets ready, proceed to plant them by line, in straight rows, six or eight feet distant, and the same distance in each row, in the quincunx order. A long line should be provided to reach quite across the ground, on which, at every six or eight feet, a knot or small bit of rag should be tied; then stretching the line, and having a quantity of sharp-pointed sticks, place one down at each of the marks, and at each a hole should be dug a foot and a half wide, or more, and filled up again with the earth and some rotten dung laid on for the purpose, raising it into a sort of hillock, for the reception of the plants, which should be planted four or five in each, by means of a dibble, putting them in within a little of the tops, one in the middle, and the others at equal distances round it, pressing the

mould well round them, and covering them with fine mould as they are finished off.

The proper season for performing this business is in the early spring, as in the latter end of March or beginning of April.

When the plantation has been thus formed, the next care is to keep it clean from weeds, by frequent hoeing. The first operation should be performed in May, choosing dry weather; and as the work proceeds, a little mould should be drawn round about each hill to form a greater body of earth immediately about the plants, continuing the hoeings during the summer, as there shall be occasion.

The plants shoot forth into tolerably strong vines early the same year; so that in May small poles may be placed to each hill for them to run up on, and they will produce a few hops the same year; though some do not pole them at all the first season, which is a better practice, only twist the vine into a bunch in June, at the top of each hill, regardless of any crop, as it is apt to weaken the young plants.

In the spring following, in February or March, it is necessary to dress or prune the hops; when the ground must be dug or ploughed, and the earth about the hills of plants be removed from the stocks or roots, clearing it quite away from the tops of the principal roots with an iron picker, for the convenience of pruning close to the head of the stock; then with a sharp knife trim off all the shoots of last year, or the remaining part of them, close to the heads of the stocks or sets; clearing away also all young suckers, and directly trim in the earth around each hill, and cover the stocks with mould two or three inches thick. The same process must be repeated annually.

After this the plants soon shoot forth into vine, or bind; when long poles, about fifteen or twenty feet in length, must be placed for them to run upon. April, or the beginning of May, when the shoots are a foot long, is the proper season for this work: three poles must be set to each hill, around the outside, let deep into the ground, by making holes for them with an iron crow, so as to place them with their tops inclining a little outward from each other, to keep the plants from entangling, and a space between two of them be left open toward the south, to admit the sun more freely.

When thus poled, they naturally twine themselves about the poles, directing such with the hand as do not readily catch hold of themselves, turning them the way of the sun's apparent motion, tying them loosely with dried rushes or other soft bandages, training two or three vines to each pole; all above that number being plucked up, if the plantation be old; but

if young, wrap them up together in the middle of the hills.

The next work is that of summer-digging, which should be done in the beginning of June. This is digging about the hills, and casting up some fine earth around, and upon each; which is sometimes repeated again the beginning of July, to make all the hills of a proper substance, for the better nourishing of the plants. And after the plants are grown up, where any of them are found under-poled, taller poles must be placed near those that are too short, to receive the vines from them; for, unless they have due length of pole, they will not yield a full crop; and if the vines are very strong and over-top the poles, it is common to strike off the heads of the shoots with a switch, whereby they throw out many lateral branches, well charged with clusters of fruit. In July they blow, and towards the end of August begin to ripen; the signs of which are, the bunches of fruit imparting a strong hop-like scent, becoming dry and hard to the touch, and the brownish colour of the seed. They are then fit for gathering, when they should be picked with all possible expedition; for a sudden storm of wind, or great rains, would do considerable damage, by breaking down the vines, and discolouring the Hops. This work must be performed in dry weather, if possible. And a certain number of hills in a square space is to be cleared at a time, generally about eleven, and a large square bin, or wooden frame, eight feet long by three broad, having a cloth within, hanging on tenter-hooks, is to be placed in the centre to receive the Hops; then proceeding by cutting up the vines of the above number of hills, and pulling up the poles, using a wooden instrument like a lever, having at one end a forked piece of iron, with teeth on the inside, which will readily raise them out of the ground; then laying two poles at a time across the bin, two or three persons standing on each side, in order to pick the Hops into it, picking them very clean without leaves and stalks; and as the bin is filled, it must be emptied two or three times a day, as there may be occasion, into a Hop-bag, and carried to the kiln to dry. This is the same as a malt-kiln, being covered with a hair cloth, on which to spread the Hops, which should be spread ten or twelve inches thick: a charcoal heat is commonly used; continuing an even steady fire, not fierce, but rather increased by degrees. In about nine hours the Hops should be turned, and in two or three hours more they may be taken off: by that time the brittleness of their stalks, and easy falling off of the leaves, determine them to be sufficiently dried.

They are then to be carried into dry upper rooms, to lie three or four weeks to toughen; otherwise they would become powder in the operation of bagging.

This is performed in large bags, made of about four eils and a half of ell-wide coarse cloth; about a handful of Hops being first tied into each corner at bottom, to serve as handles; the bag is then fastened to a hole of due width in the floor, made for that purpose, having a hoop fastened to the mouth of the bag, on which it rests on the edges of the hole; then a person puts the Hops into the bag, while another is continually treading them down, till the bag is full; the bag is then unfastened from the hoop, and let down; and the mouth closed up, tying a handful of Hops also in each corner, as in the bottom part; they are then ready for market, &c.

A plantation of Hops will continue in good bearing several years, provided the ground is properly manured; for which the proper manure is well rotted dung, or a compost of dung and earth, prepared some time for that purpose; and of either, from about twenty to forty cart-loads are the common allowance for an acre; the former quantity is generally allowed when dung is scarce, laying it only along the hills of plants to be dug in in winter or spring; but the best way is to allow about forty loads, and dig or plough it in any time from October till March; as such a dressing need not be repeated but once in two or three years, or thereabouts.

After the ground is cleared every year from the Hops, care should be taken of the poles, which, if they could be laid under any covered place, it would greatly preserve them; but for want of such convenience, they are usually placed in parcels upright in the open air, first fixing three or six poles firmly in the ground, in a triangular manner, wide at bottom, and tied together at top; then setting as many of the rest of the poles about them as may seem convenient. And as the poles decay, new ones must be provided. These may be of any wood; but the sorts commonly used are ash, birch, maple, sycamore, willow, poplar, and chesnut. It requires about three thousand poles to an acre, allowing three to each hill.

These plants are seldom cultivated in the garden, but as climbers for the purpose of affording ornament and variety, as they readily twist round any support to the height of twenty feet or more.

HURA, a genus furnishing a plant of the exotic tree kind, for the stove.

It belongs to the class and order *Monocotyledon*

Monadelphia, and ranks in the natural order of *Tricoccoe*.

The characters are: that in the male flowers the calyx is an ament from the divarication of the branches, oblong, drooping, covered with sessile, spreading florets: scales oblong: perianthium within each scale of the ament, cylindric, two-leaved, truncate, very short: there is no corolla: the stamina have a cylindric filament, a little longer than the calyx, peltate at the tip, rigid, below the tip twice or thrice verticelled with tubercles: anthers two, immersed in each tubercle, oval, bifid: female flower in the same plant: the calyx is a one-leaved perianthium, cylindric, furrowed, truncate, quite entire, closely surrounding the germ: there is no corolla: the pistillum is a roundish germ, within the calyx: style cylindric, long: stigma large, funnel-shaped, plano-convex, coloured, twelve-cleft, blunt, equal: the pericarpium woody, orbiculate, or globular-flattened, torose, with twelve furrows, twelve-celled: cells dissilient, crescent-shaped, with an elastic dagger point at the end: the seeds solitary, compressed, sub-orbiculate, and large.

The species is *H. crepitans*, Sand Box Tree.

It rises with a soft woody stem to the height of twenty-four feet, dividing into many branches, which abound with a milky juice, and have scars on their bark, where the leaves have fallen off. The branches are garnished with heart-shaped leaves; those which are biggest are eleven inches long, and nine inches broad in the middle, indented on their edges, having a prominent midrib, with several transverse veins from that to the sides, which are alternate; these stand upon long slender footstalks: the male flowers come out from between the leaves, upon peduncles which are three inches long; they are formed into a close spike, or catkin, forming a column, lying over each other like the scales of fish. The female flowers are solitary, and very near the ament, the leaves are alternate, and accompanied by caducous stipules; the petiole is glandular above; the younger leaves are involuted. The fruit is curious in its structure; and the tree, when it grows well, spreading and shady. It is a native of the Spanish West Indies.

Culture.—This plant is increased by sowing the seeds procured from abroad, in the early spring, in pots filled with rich earth, plunging them in a mild hot-bed of bark. When the plants have attained a few inches growth, they should be removed into separate pots of a small size, watering them, and replunging them in the bark bed of the stove, where they must be constantly kept, being occasionally removed

into larger pots, and sparingly watered in the winter season.

When thus managed, they will attain twelve or fifteen feet in growth in this climate, and often afford flowers.

They afford ornament and variety in the stove collections.

HYACINTHUS, a genus containing plants of the bulbous-rooted flowering perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters are : that there is no calyx : the corolla is monopetalous, campanulate : border six-cleft, reflex : nectary, three honeyed pores, at the tip of the germ : the stamina have six awl-shaped filaments, shorter : anthers converging : the pistillum is a superior germ, round-three-cornered, three-furrowed : style simple, shorter than the corolla : stigma obtuse : the pericarpium is a roundish capsule, three-sided, three-celled, three-valved : the seeds in pairs (generally), roundish.

The species cultivated are : 1. *H. orientalis*, Eastern or Garden Hyacinth ; 2. *H. non scriptus*, Common Hyacinth, or Harebells ; 3. *H. cernuus*, Bending Hyacinth ; 4. *H. serotinus*, Late-flowering Hyacinth ; 5. *H. amethystinus*, Amethyst-coloured Hyacinth ; 6. *H. muscari*, Musk Hyacinth ; 7. *H. monstrosus*, Feathered Hyacinth ; 8. *H. comosus*, Purple Grape Hyacinth ; 9. *H. botryoides*, Blue Grape Hyacinth ; 10. *H. racemosus*, Clustered Grape Hyacinth.

The first has a large coated bulb, viscid, and of a sweetish taste, from the bottom of which spring the roots, which are long round fibres, of a middling thickness ; from the middle of it a single naked stem or scape ; and from the top six, seven, or more leaves : the leaves are broadish, keeled, pale green at bottom, but of a darker green towards the end : the scape is a long span in height, smooth, roundish, pale green below, but tinged with brown towards the top : from the middle of this to the top come out the flowers one above another, not pointing the same way, as in the Harebell, but standing on different sides of the stalk ; three, four, or five, to twelve or more in number, each nodding on pedicels, half an inch in length, usually of a very dark green colour, and having a pair of small bractes at the base : the corolla is near an inch in length, almost cylindrical except at the base, where it swells or bellies out, and at the top the segments are turned back a little : these flowers have a very sweet smell, and are much valued for the variety of their colours, as pure white, white tinged with blue, all shades of blue from these to the dark

violet, and all shades of red purple from the faint blush to the deep red ; they are also sometimes yellow. It is a native of the Levant ; flowering in March and April.

There are varieties with single white flowers, with double white flowers, with red single and double flowers, with flesh-coloured single and double flowers, with blue single and double flowers, with purple-blue single and double flowers, with flesh-coloured single and double flowers, with yellow flowers, with double white flowers, with red eyes or middles, with double white with purple eyes, with double white with flesh-coloured eyes, with double white with yellow eyes, with double agate-blue, with double and single porcelain-blue, with double and single violet-coloured flowers.

There are also many intermediate varieties which have been obtained from seed, and by which many new ones of the above principal sorts are annually gained ; each variety being distinguished either by the name of the place where first raised, the person who raised them, or that of illustrious personages, as the greatest kings, the bravest generals, the most famous poets, the celebrated ancient historians, and gods and goddesses.

It is this species and varieties that are commonly esteemed and cultivated by florists.

The chief properties which distinguish the good Double Hyacinth are, that the stalk be tall, strong, and upright : the flowers or bells sufficiently numerous, each suspended by a short strong peduncle, in a horizontal position ; the whole having a compact pyramidal form, with the crown or uppermost flower perfectly erect : the flowers should be large, and well filled with broad bold petals, appearing to the eye rather convex, than flat or hollow : they should extend to about the middle of the scape or stalk : the plain colours should be clear and bright, strong ones being in general preferred to pale colours, and such as are mixed should blend with elegance.

In the second species the root is roundish, about the size of a nutmeg : the scape from six inches to a foot in height, upright, round, smooth, and solid, bowed down when it begins to flower : the leaves are four, six, or sometimes more, only half the length of the scape, and about half an inch broad, keeled, hollow, smooth, shining, grass green, flaccid, bending downwards, ending in an acute point : the flowers are in a long raceme or spike, from eight to twelve, often more, all pointing one way, pedicelled, pendulous, sweet-smelling, blue or violet colour, varying to white and flesh-coloured, six-parted to the very base. It is a native of France.

The third agrees with the first sort in habit

and appearance; but it is smaller, and differs in having the leaves more linear or less lanceolate, and more erect; the raceme is more nodding; the corollas flesh-coloured, not blue, rounder, with the sides of the petals less spreading, flat at the base, not marked with a raised line on the back, and less rolled back (though still reflex) than in that. It is a native of Spain.

The fourth species has an ovate-conical, solid bulb, covered with brown skins: the scape single, a foot high, and smooth: the leaves channelled, sheathing the scape at the base, shorter than the scape, sharp at the end: the flowers in a raceme, all pointing the same way, drooping a little; each on a short peduncle, with an awl-shaped bracte at the base: the corolla is of a dull greenish red colour. When the flowers first appear, they are of a light blue, but fading to a worn out purple colour. It is a native of Spain; flowering here in June.

In the fifth the root is the size of a small olive, covered with a brown skin: the leaves five or six, longer and narrower than in the first sort, striated and keeled, lying mostly on the ground: the scape slender, a long span in height, round, smooth, glaucous, having six or seven flowers at top (sometimes twelve or more), nodding, on pedicels half an inch in length; they are bright blue, smaller than those of the first sort, without any scent. They are smaller and of a deeper blue than the above.

Most of these have white stripes and edges; and they vary to pure white, and a fine pale red colour, with deeper-coloured veins running along the three outer segments. It was formerly known by the name of *Coventry Blue Hyacinth* by gardeners. It is a native of Spain, flowering in April and May.

The sixth species has pretty large, oval, bulbous roots, from which arise several leaves, which are about eight or nine inches long, and half an inch broad; incurved a little on their sides, and end in obtuse points; these embrace each other at their base; out of the middle of these, the stalk which sustains the flowers arises; it is naked below, but the upper parts are garnished with small flowers growing in a spike; these have ovate pitcher-shaped petals, which are reflexed at their brim, and are of an ash-coloured purple, seeming as if faded, but have an agreeable musky scent: the stalks do not rise more than six inches high. Where they are in quantity, they perfume the air to a considerable distance. It is a native of the Levant, flowering in April.

There are varieties with the same coloured flowers on the lower part of the spike, but larger, and more of the purple cast; and those on the up-

per yellow, with a very grateful odour, and with very large yellow flowers.

The seventh has a large bulbous root, from which come out several plain leaves a foot long, and about half an inch broad at their base; they are smooth, and end in obtuse points: the flower-stalks rise near a foot and a half high; are naked at the bottom for about seven or eight inches, above which the panicles of flowers begin, and terminate the stalks: the flowers stand upon peduncles which are more than an inch long, each sustaining three, four, or five flowers, whose petals are cut into slender filaments like hairs; are of a purplish blue colour, and, having neither stamina nor germ, do not produce seeds. It is a native of the south of Europe, flowering in May, after which the stalks and leaves decay to the root, and new ones arise in the spring following.

The eighth species has the root bulb as large as a middling onion, which is ovate, solid, and white, covered with a purplish skin: the leaves five or six, a foot (or eighteen inches) long, and three quarters of an inch broad at the base, diminishing gradually to a blunt point; (linear, channelled, bright green): the flower-stalk rises about a foot (or eighteen inches) in height (round, upright, smooth, glaucous green): the lower half is naked, but the upper part has a loose raceme of flowers, frequently for a foot in length: the lower flowers are further asunder; before they flower they are upright, but while they flower, and afterwards, they stand out horizontally on pedicels half an inch in length; their colour yellowish green, with blue or purple at the end: these are fertile. The upper ones smaller; leaves stand upright, forming a corymb, and are blue or violet, as also their long pedicels. It is a native of the South of Europe, flowering the end of April and beginning of May.

There are varieties, with white and with blue flowers. Mr. Curtis terms it the Two-coloured or Tassel Hyacinth. It is distinguished more by its singularity than beauty.

The ninth has the leaves three lines wide, straight on account of their short petioles: the spike has from twenty to thirty flowers: the teeth of the corolla are white, and the uppermost are small: and the leaves are rolled into a cylinder: the raceme (or spike) an inch long; the flowers nodding, sweet-smelling, scarcely longer than their upper pedicels. It grows naturally in the vineyards in France; and where once planted in a garden, it is not easily rooted out, as the roots multiply greatly.

There are varieties with blue, with white, and with ash-coloured flowers.

The tenth species has a small bulb: the leaves

are keeled, very narrow, a line or little more in breadth, cylindrical, on account of the weakness of their petioles loose and decumbent, rolled round and twisted in a variety of ways: the scape a span high, blue under the flowers, compressed at top, terminated by a close globular spike or raceme of from forty to fifty flowers, of a very dark blue, with a three-cornered white mouth; they are imbricated downwards, have very short peduncles, a sweetish smell, somewhat like new starch, or plums. It is a native of the South of Europe; flowering in April and May. Mr. Curtis terms it Starch Hyacinth.

Culture.—The first sort and varieties are all increased by planting the off-sets from the roots in the manner of other bulbous-rooted perennial plants; and by sowing the seed to produce new varieties.

They succeed best in a light soil, but will prosper in any common earth, particularly in moderate sandy ground, in a dry, open, sunny situation. These bulbs, if planted in strong or very moist land, are apt to rot in winter, or become diseased. Where, therefore, the soil of the flower-borders or beds is of a strong heavy quality, the part designed for Hyacinths should have light materials, such as any light sandy earth, from the surface of some common or other place; drift sea-sand, or any upper sandy soil, or light earthy compost; and where the soil of the borders, &c. is of a very light, sharp, sandy nature, a portion of light, mellow, loamy earth, and neat's dung, or well rotted dung of old hot-beds, make a fine compost surface mould for the Hyacinth, when mixed and laid on long enough before for the dung to be converted into mould.

The ground should be well wrought over as a preparation for the plants, one spade deep at least, raising the bed or border a little above the general level to avoid moisture; and raking the surface smooth and even.

The florists mostly prepare a compost for their rare kinds of Hyacinths, with light, sandy loam, or any sandy earth from a pasture-field, taking only the top spit, ten or twelve inches deep, adding about one third, from the surface, to one of drift or sea-sand, and the same quantity of rotten neat's dung; mixing the whole in a heap ridge-ways, in some dry sunny exposure, to lie several months, or if a year or more the better.

To the above material, some also add a quantity of rotten leaves of trees, thoroughly rotten tanner's bark, or any perfectly rotten earthy wood, or rotten saw-dust; all of which together greatly improve the composition: but as these are not always readily obtained, the other compost is frequently used with success. With these composts a bed is prepared in the beginning of au-

tumn, four feet wide and two deep, a cavity being dug out that width and depth, and filled up entirely with the composition, six inches above the common level, to allow for settling, leaving it a fortnight or a month to settle; when it is ready for the reception of the bulbs.

The curious in these plants never plant the fine sort two years together in the same bed or earth, without some previous renewal, as by planting them every year in a fresh bed, or fresh prepared compost, it greatly improves the size and beauty of the flowers.

The proper season for planting them is either in October, or the beginning of November; as those then planted shoot early in spring, and flower strong at their usual season; but those planted later in autumn, or continued out of ground till January and February, for a late bloom, flower weaker and with inferior beauty; the principal part should always be planted in the autumn.

When any of the common kinds are intended to be planted to adorn the open borders contiguous to the principal walks, or lawns near the habitation, to increase the variety in assemblage with other bulbous-rooted spring flowers, as early Tulips, Narcissuses, Anemones, Ranunculuses, &c. they should be disposed towards the front, more or less, in a varied order, in patches of three roots in each, three or four inches deep; and the patches may be from about one yard to three or four distance, letting them stand to take their chance, without any further care.

In planting the fine double sorts, four or five rows may be planted on each bed lengthways, about nine inches distant in each row, and about four inches deep, either in drills drawn the above depth, by dibble, or by bedding them in; and as soon as they are planted, in either method, the surface of the bed should be raked smooth and even.

The bulbs being thus planted, the choicest sorts should be protected in the beds occasionally during winter, from severe frost. They may be readily protected by a covering of straw, or any kind of dry strawy litter, three or four inches thick; or by arching the beds with hoops or rods, or with moveable arched frames of open work, covered with mats, the coverings being immediately removed when not wanted. The same caution should be continued in the spring.

When the flower-stems are advanced nearly to their full height, it is proper to support them, by placing a small stick, fifteen or eighteen inches long, close to each plant, being careful not to thrust it into the bulb, and to tie the stems neatly to each stick, by which the spikes of flowers will be preserved in an upright position.

When in bloom, the curious sorts may be preserved much longer in beauty, by being screened occasionally from the sun and rain, by a sort of awning or umbrella of mats or canvass; they should however be shaded only from the mid-day sun, from about ten to three or four o'clock, and only from excessive rains and boisterous winds.

But when the flowers begin to fade, all covering should be entirely removed, that the bulbs and increasing off-sets may derive all possible benefit from the free air, dews, &c.

When the season of flowering is over, the bulbs should be taken up, which in the florists' language is called lifting the roots. The fine sorts should be taken up at this period, to separate off-sets for increase, as well as to benefit the main bulbs, which will always flower stronger than such as are suffered to remain two or more years unre-moved.

The proper time for this work is in summer, soon after they have done flowering, when their leaves begin to turn yellow, as then the bulbs have had their full growth for that season, and should by no means remain longer in the ground.

Dry weather should be chosen, and a trowel, or small spade, is proper for lifting them, taking them up one by one, and breaking off the stem within an inch or two of its origin; then laying them in an airy room, out of the mid-day sun, to dry off the gross moisture very gradually, and to ripen the bulbs to a due hardness, when they appear of a purplish tinge; otherwise they are apt to rot.

When the bulbs are properly hardened and ripened, they should be taken up and separated from any off-sets, well cleared from earth, loose skins, and fibres at bottom; then, after exposing them a few hours in the sun, put up in boxes singly, or upon dry shelves out of the sun, to remain till the season for planting them again.

All the off-sets appearing about the main bulbs at the lifting season, are to be carefully separated from them, either as soon as they are taken up, or after the bulbs have lain to ripen, being kept separate, and planted in the early autumn, in beds by themselves, in rows six inches asunder, and two or three deep, where they should remain a year or two; then be taken up at the proper lifting season in summer, and managed as the large blowing roots.

In raising these bulbs from seed, which is practised by the curious, to obtain new varieties, to increase their stock; from the time of sowing, it will be four or five years before the bulbs produce flowers: the seed ripens in the summer,

which may easily be saved, by suffering some of the finest singles and half doubles to stand to ripen it in perfection.

The proper season for sowing it is in the beginning of autumn; when the plants will come up in the spring following. It grows freely in the open ground, in a bed or border of light earth; but when no great quantity is to be sown, it may be put into pots or boxes, which will be convenient to move occasionally to different situations at different seasons. In either method choose rich light earth, making the surface smooth, sowing the seeds evenly, and covering them an inch or an inch and a half deep: if they are sown in pots or boxes, let those be plunged to their rims in a dry place, and in November remove them either under a hot-bed frame to have occasional shelter in winter, or cover them at the approach of hard frost with some light dry litter, using the same precaution as for those sown in beds; but let them be fully exposed in all mild weather.

When they appear in the spring, first with very small leaves, they should be kept very clean from weeds, sifting a little earth over the bed in autumn, and in winter use the same precaution as before. In the second summer, when their leaves begin to decay, take up the young bulbs, to be planted out in nursery-beds, which may be done in August or September, planting them in small drills two inches deep, having the drills three or four inches asunder. In this situation they may stand two years, sifting half an inch of earth over the surface in autumn, and giving occasional coverings in winter: after this they are to be taken up at the usual lifting-season, and managed as the other bulbs, and planted in autumn where they are to flower.

The other species are capable of being increased readily, by planting the off-sets in the same manner as above, which all the sorts produce in great plenty, and which may be taken up every second or third year when the leaves decay, and the off-sets be separated and managed in the manner as the first sorts.

Blowing them in Water Glasses. — These bulbs may be brought to flower in winter and spring, by placing them in root-glasses of water, or in pots, or small boxes of sand, or light, dry, sandy earth, in the early autumn, and placing them in a warm apartment, or in a green- or hot-house; in all of which they will blow very agreeably, earlier or later in the above seasons, according to the time the bulbs are planted and introduced.

The glasses for this purpose are sold at the glass-shops, and many of the principal seed-shops and nurseries, at from five to nine shil-

lings per dozen; they are of the bottle kind, but with straight upright bodies narrowing a little upward gradually to the tops, where they terminate in wide, concave mouths, to contain each one root or bulb. They should be filled with soft, clear water, up to the necks, and a little way in the concavity of the mouths; one bulb placed in each glass, with the bottom or root part a little in the water, the top upright; and the bottles set either within a room window, which if towards the sun, will be of greater advantage, or placed on a chimney-piece, or shelves of a light room, where a fire is kept, to bring the bulbs forwarder in growth.

They soon put forth strong root-fibres down into the water, and push leaves and flower-buds at top, which advance regularly for flowering in their peculiar manner. The water should be renewed occasionally when it becomes foul or fetid, discharging the old, and immediately filling up the bottles with fresh water, which is all the culture they require. When the stalks and flower-spikes are considerably advanced, a neat small stick should be placed to each, to support it in an upright growth. But to obtain them in bloom at the most early period, some glasses containing the bulbs should be placed in a hot-house or forcing-house, &c.

In the glasses, the bulbs flower in about six, eight, or ten weeks, accordingly as they are placed. They continue three or four weeks in bloom.

By planting some bulbs in pots or neat boxes of light earth or sand in the autumn, and placing them in a dwelling-room, green-house, &c. they will flower at an early season.

But they flower most early, as has been just observed, in a hot-house, or forcing department, under glasses, worked either by fire or bark-bed heat, &c. Some middling small pots should be provided for this use, or small, neat, oblong boxes, six inches deep, filling them half way, or a little more, with dry light earth, or that of a sandy nature, or with sand; planting one, two, or three bulbs in each pot, according to the size; pressing the bottom gently into the earth, and filling up with more earth or sand over the crown of the bulbs; or, in boxes, several may be planted in each, in the same manner. When thus planted, place the pots or boxes in the house, giving moderate waterings with soft water, when the earth appears dry. They will flower in six or eight weeks. When the flowering is past, and the stalks and leaves decayed, the bulbs should be taken up, cleaning and drying them, and they may afterwards be planted in the full ground for the future year, to recover strength, and produce some good offsets.

The sorts generally used for glasses and pots, &c. are principally any varieties of the oriental kind, especially for blowing in water.

In procuring them, care should be taken to choose perfectly sound, firm bulbs, with the root part at bottom, full, plump, and firm.

They are all very beautiful and ornamental plants. The more hardy and common sorts in patches of five or six in the fronts of borders, clumps, and other parts; and the finer double sorts in beds, pots, boxes, and glasses.

HYDRANGEA, a genus containing plants of the shrubby and flowering perennial kinds.

It belongs to the class and order *Dicandria Digynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-leaved perianthium, five-toothed, permanent, small: the corolla has five petals, equal, roundish, larger than the calyx: the stamina have ten filaments, longer than the corolla, alternately longer and shorter: anthers roundish, twin: the pistillum is a roundish germ, inferior: styles two, short, distant: stigmas blunt, permanent: the pericarpium is a roundish capsule, twin, two-beaked with the double style, angular, with several nerves, crowned with the calyx, two-celled, with a transverse partition, opening by a hole between the horns: the seeds numerous, angular, acuminate, very small.

The species cultivated are: 1. *H. arborescens*, Shrubby Hydrangea; 2. *H. hortensis*, Garden Hydrangea, or Chinese Guelder Rose.

The first has a spreading woody root, which produces several soft, pithy, woody stems, from three to four feet high; they are four-cornered when young, and have a green bark, but as they grow older they become taper, and have a light-brown bark: the leaves at each joint opposite, three inches long, and two broad near the base, pointed, serrate; they are deep green above, and pale underneath, with many transverse veins; the petioles are about an inch long: the flowers terminating in a cyme: the corolla small, white, having an agreeable odour. It is a native of Virginia, &c. flowering towards the end of July, and in August.

The second species has a fibrous root, much branched, whitish: the stems several, growing together, erect, shrubby, branched, round, with a smooth brown bark: the branches opposite, each pair crossing the others, round, smooth, leafy, green, with dark purple spots, flowering at the top: the leaves are opposite, spreading, and curved backwards, obtusely pointed, entire towards their base, bright green, pale beneath: foot-stalks short and thick, smooth, pale, channelled above: the cymes terminating, the size and

figure of the common Guelder Rose, and like that almost entirely composed of radiated abortive flowers, of a beautiful rose-colour, inodorous, green when young as well as in decay: the flower-stalks are variously subdivided, smooth, sometimes hairy: partial ones of a deep rose-colour, roundish. It is much valued on account of the great profusion of its elegant flowers. It is commonly cultivated in the gardens of China and Japan.

Culture.—The first is increased by slipping or parting the roots in the early autumn, and planting them out where the plants are to grow. It succeeds best in a moist soil, and requires no trouble but being kept free from weeds, by digging the ground about it in the winter. When the stems are destroyed in severe frosts, new ones are put forth in the ensuing spring.

The second sort is easily increased by planting cuttings of the young shoots, in pots of rich loamy earth, in the spring, plunging them in a moderate hot-bed. When they have stricken good root, they should be removed with balls of earth about their roots into separate pots, and be placed in the green-house.

Though this plant is capable of standing the open air in mild winters, in warm dry situations, it does not flower so well as in the green-house. Superfluous plants should therefore only be employed in this way.

These are ornamental plants; the former in the fronts of the clumps and borders, and the latter among green-house collections and other potted plants, where it produces a fine appearance.

HYDRASTIS, a genus affording a hardy perennial plant.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Ranunculaceæ*.

The characters are: that there is no calyx: the corolla has three petals, ovate, regular: the stamina have numerous filaments, linear, compressed, a little shorter than the corolla: anthers compressed, blunt: the pistillum has numerous germs, ovate, collected into an ovate head: styles very short: stigmas broadish, compressed: the pericarpium is a berry, compounded of oblong acini, or granulations: seeds solitary, oblong.

The species is *H. Canadensis*, Canadian Yellow-root.

It has the root composed of thick fleshy tubers, of a deep yellow colour within, but covered by a brown skin, sending out fibres from several parts in the spring: it sends up one or two stalks about nine inches high, at their first appearance of a light green, but afterwards

changing to a purplish colour, and hairy towards the top. Each stalk has one or two leaves, the lower petioled, but the upper embracing; they are six or seven inches in diameter, and are deeply cut into three, four, or five lobes, which are irregularly serrate; they are of a light green in the spring, but change afterwards to a deep green, with some dark spots or marks, and after the flower is decayed turn to a purplish colour. The stalk is terminated by one flower, which is white, and of very short duration, seldom continuing above three or four hours after it is expanded. The fruit is red and succulent. It is a native of Canada, flowering in May and June.

Culture.—This plant may be increased by sowing the seed, as soon as the fruit is well ripened, in pots of pretty strong earth, protecting them from frost during the winter, and in the spring, when the plants appear, setting them in a shady situation till the autumn, when they may be planted where they are to remain.

It succeeds best in a moist shady situation, where it is not disturbed.

These plants serve to afford variety in such situations.

HYMENÆA, a genus containing a plant of the stove exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leaved perianthium, coriaceous: tube short, turbinate, compressed, permanent, with an oblique mouth: limb five-parted, almost regular, upright, deciduous: segments ovate, blunt: two opposite flattish, a little broader: two others concave, with one side narrower: the corolla five-petalled, inserted into the neck of the calyx, sub-papilionaceous, with the petals almost equal: banner, the two uppermost petals, obliquely ovate, obtuse, sessile, at the upper concave segment of the calyx: wings, two petals, similar, lateral, a little narrower: keel, the lowest petal, channelled and excavated, approximating to the wings, within the lower hollow segment of the calyx: the stamina have ten distinct filaments, awl-shaped, erect, bent down above the middle, very long, between the keel and the wings, inserted into the neck of the calyx: anthers linear, fixed by the back: the pistillum is a germ, sabre-shaped, compressed, pedicelled: style very long, bristle-shaped, bent down: stigma thickened, obliquely truncate: the pericarpium is a woody legume, very large, ovate-oblong, obtuse, one-celled, filled with farinaceous pulp: the seeds several (four to eight, large), ovate, wrapped up in pollen and fibres.

The species is *H. Courbaril*, Locust Tree.

It is a large spreading tree in its native situation: it has a large stem, covered with a russet bark, which divides into many spreading branches, garnished with smooth stiff leaves, which stand by pairs, their base joining at the foot-stalk, to which they stand oblique, one side being much broader than the other, the two outer sides being rounded, and their inside straight, so that they resemble a pair of sheep-shears; they are pointed at the top, and stand alternately on the stalk: the flowers are produced in loose spikes at the end of the branches, some of the short ligneous foot stalks supporting two, and others three flowers, which are composed of five yellow petals striped with purple, succeeded by thick, fleshy, brown pods, shaped like those of the garden bean. It is a native of the West India islands and America.

Between the principal roots of the tree exudes a fine transparent resin of a yellowish or red colour, which is collected in large lumps, and called gum Anime. It makes the finest varnish known, by being dissolved in the highest rectified spirits of wine.

Culture.—This is propagated by the seeds, which should be sown singly, in pots of a small size, filled with light earth, in the spring, plunging them in the bark hot-bed. When the plants have attained a little growth, they must be removed into the tan bed of the stove, where they must constantly remain, being managed as other tender plants, little water being given in the winter. Though the plants make much progress at first, they are soon at a stand, and only preserved with difficulty.

They afford variety in the stove.

HYOSCYAMUS, a genus comprehending plants of the annual, biennial, and perennial herbaceous and shrubby kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridæ*.

The characters are: that the calyx is a one-leaved tubular perianthium, ventricose at bottom, with a five-cleft sharp mouth, permanent: the corolla one-petalled, funnel-form: tube cylindrical, short: limb from erect, spreading, half-five-cleft: segments obtuse, one broader than the others: the stamina have five awl-shaped filaments, inclining: anthers roundish: the pistillum is a roundish germ: style filiform, the length of the stamens: stigma headed: the pericarpium is an ovate capsule, obtuse, marked with a line on each side, two-celled, two capsules closely approximating, with a lid opening horizontally: receptacles half ovate, fixed to the

partition: the seeds numerous, unequal (irregular).

The species cultivated are: 1. *H. niger*, Black, or Common Henbane; 2. *H. reticulatus*, Egyptian Henbane; 3. *H. albus*, White Henbane; 4. *H. aureus*, Golden-flowered, or Shrubby Henbane; 5. *H. pusillus*, Dwarf Henbane; 6. *H. physaloides*, Purple-flowered Henbane; 7. *H. Scopolia*, Nightshade-leaved Henbane.

The first has long fleshy roots, which strike deep into the ground, and are branched: the bottom leaves are soft, deeply slashed on their edges, and spreading on the ground: the stalks which do not rise till the second spring, have leaves of the same shape, but smaller, and clasping, and are about two feet high; on the upper part are flowers standing on one side in a double row, sitting close to the stalk alternately. Martyn observes, that the whole plant is covered with unctuous foetid hairs: the corolla is yellow, or rather pale yellowish brown, beautifully netted with purple veins, and a dark purple eye or base: the shape is irregular, gradually tapering into the tube, with five prominent ribs on the outside; the upper segment is the largest, the rest gradually diminishing downwards: the upper incisions are shallow, the lowermost extending half way to the base, and much wider than the rest. It is biennial, forming the root and flower-leaves the first, and the stem and fructification the second season; a native of most parts of Europe, flowering in June. The root, herb, and seeds, are said to be poisonous.

There is a variety in which the corolla and anthers are of a pure brimstone colour, without any tinge of purple.

The second species rises with a branching stalk two feet high: the lower leaves are regularly cut on both sides into acute segments, which are opposite, but the upper leaves are entire: the flowers grow at the end of the stalk, in bunches: they are of a worn-out red colour, and shaped like those of the common sort, but their tubes are swollen. Martyn adds, that the whole plant is smooth, resembling the first, but the stem-leaves are ovate, repand, more smooth above; the floral leaves ovate, sessile, entire: the flowers on a very short peduncle: the corolla bell-shaped, red, beautifully netted with dark veins. It is annual, and a native of Egypt, &c. flowering in July.

The third resembles the first in most circumstances, but the leaves are more rounded or obtuse, petioled, sinuate, very soft, bearded with white hairs, as is also the stem: the flowers fewer, the lower ones on longer peduncles, but the upper flowers have very short ones: the calyx is green, five-toothed, and hairy: throat of

the corolla longer than in the first sort: limb revolute, five-cleft, with unequal segments: the capsule clothed with the calyx, membranaceous, knobbed with the protuberant seeds, ovate, ventricose at bottom, marked with a depressed streak on each side: the receptacle fungose, scrobiculate, ovate-oblong, plano-convex, fixed on both sides to the partition: the seeds very numerous, small, compressed a little, incurved or kidney-form, closely scrobiculate, whitish ash-coloured. It is annual, and a native of the south of Europe, flowering in August.

It has the corolla varying with the base dark purple, or green.

The fourth species is a perennial plant (biennial), with weak stalks, which require support: the leaves are roundish, acutely indented on their edges, and on pretty long foot-stalks: the flowers come out at each joint of the stalk; they are large, and of a bright yellow, with a dark purple bottom: the style is much longer than the corolla: the stem is hairy, and about a foot high: the petioles very hairy: the leaves lobed, toothletted: the peduncles at the side of the petioles, erect with the flower, but quite bent down when in fruit: the outer lobe of the corolla is larger than the rest, and the lower sinus is cut beyond the limb, and there the purple stamens with the very long pistil issue and hang down. It is a native of Candia, flowering most part of the summer.

It varies in size and the shade of the colour in the corolla.

The fifth is an annual plant, a hand in height: the stem oblique, brittle, undivided, having long hairs: the lower leaves entire, upper oblong, toothed, alternate, sparingly hairy, on petioles of the same length with themselves: the peduncles short on the outmost stem, each from the axil of two opposite leaves: the calyxes turbinate, ten-angled, almost the length of the corolla, and broader than its tube, spiny at top: the corolla yellow, with a dark throat, divided on the lower side beyond the limb: the stamens declining. It is a native of Persia, flowering in July.

The sixth species has a perennial root: the stems a foot high, simple, erect, round, rough-haired: the leaves alternate, petioled, cordate, lucid-green, veined, rough-haired underneath, the upper ones gradually larger: the flowers in bundles, terminating, peduncled: the calyxes very short, five-toothed, rough-haired: the corollas purplish, funnel-form, upright: the stamens a little shorter than the corolla, converging: the style the same length with the corolla: the stigma capitate, emarginate, whitish. It flowers early in spring, and is a native of Siberia.

The seventh has also a perennial root, transverse, knobbed, thick, irregular, branched, flexuose, the thickness of the human thumb: the stem herbaceous, annual, upright, round, smooth (scarcely more than a foot high, according to some, but even three feet in height, according to others), the thickness of the human finger, trifid and bifid, with dichotomous branches: (the branches only two, according to Linnaeus, spreading, and entirely simple; or, subtrichotomous, with a groove running down from the leaves:) the leaves ovate and oblong, the length of the human finger; the lower quite entire; the upper frequently moderately sinuate or repand: according to some, petioled, naked, somewhat wrinkled, spreading; on the stem alternate, solitary; under the forkings in threes, two of which approximate; on the branches alternate, but two together on the same tooth or base, one of which is a little less than the other: but, according to others, subovate or lanceolate, entire, except the lower ones, which in gardens at least are sinuate-toothed in front, veined, wrinkled, decurrent; the lower ones opposite, the rest scattered: the peduncles one-flowered, pendulous from the axils, weak, two inches long: the calyx smooth, five-toothed, permanent, wider than the fruit, and, as it were, inflated (bell-shaped, five-cleft, awnless): the corolla three times the length of the calyx, bell-shaped, slightly five-cleft, blunt, on the outside ferruginous, with a few pale streaks, within yellow, oblong, large, five-toothed, narrowing at the base into a short tube, yellowish purple, deciduous. It is a native of Idria in Friuli, flowering in the middle of April.

Culture.—They are all capable of being raised from seeds, by sowing them in the autumn in the situations where they are to stand. If the seeds be permitted to scatter, they also produce abundance of good plants.

In the fourth or shrubby sort, the seeds should be sown in pots, when perfectly ripened in the autumn, plunging them in a moderate hot-bed during the winter. When the plants have attained some growth in the spring, they should be removed into separate pots, and be replaced in the bed, due shade and water being given. It may also be increased by planting cuttings in a shady border of light earth, in the summer season, and when well rooted removing them into separate pots.

The only culture which the common sorts require is that of being kept clean from weeds, and properly thinned. The second sort succeeds best in a dry warm situation, or when planted in pots, and protected in the winter season. The fourth sort must be placed so as to have protec-

tion from frost in the winter season, and plenty of fresh air in mild weather.

All the sorts, except the second and fourth, may be introduced so as to afford variety in the borders and clumps of pleasure-grounds; but these two may be placed out among other more hardy potted sorts, or in collections of green-house plants, with good effect.

HYPERICUM, a genus furnishing plants of the shrubby and under-shrubby, hardy and tender kinds.

It belongs to the class and order *Polyadelphia Polyandria*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a five-parted perianthium: segments subovate, concave, permanent: the corolla has five petals, oblong-ovate, obtuse, spreading, wheel-shaped, according to the sun's apparent motion: the stamina have numerous capillary filaments, united at the base in five or three bodies: anthers small: the pistillum is a roundish germ: styles three (sometimes one, two, or five), simple, distant, the length of the stamens: stigmas simple: the pericarpium is a roundish capsule, with the same number of cells as there are styles: the seeds very many and oblong.

The species cultivated are: 1. *H. balearicum*, Warted St. John's-wort; 2. *H. Ascyron*, Great flowered St. Peter's-wort; 3. *H. Androsæum*, Common Tutsan; 4. *H. Canariense*, Canary St. John's-wort; 5. *H. hircinum*, Stinking Shrubby St. John's-wort; 6. *H. monogynum*, Chinese St. John's-wort.

The first rises with a slender shrubby stalk in this country, about two feet high; but in its native soil it acquires the height of seven or eight feet, sending out several weak branches of a reddish colour, and marked with scars where the leaves have fallen off: the leaves are small, oval, waved on their edges, and having several small protuberances on their under side: they sit close to the branches, half embracing them at the base: the flowers are terminating, large, bright, yellow. It is a native of Majorca.

The second species has a stem a cubit and half high, round, smooth, rufescent: the leaves are pale green, paler underneath, an inch long and half an inch wide, roundish, opposite: the flowers terminating: calyx green: corolla pale yellow, five times as large as in the common sort. It is a native of the Pyrenees.

The third has a perennial, thick, woody root, of a reddish colour, sending out very long fibres: the stems suffruticose or under-shrubby, ancipital two-edged or slightly winged on opposite sides, two feet high and more, branched towards

the top, of a reddish colour, and smooth: branches brachiate or decussated, spreading: the leaves opposite, sessile, ovate, entire, smooth, dark green, glaucous on the under side, netted with numerous projecting veins and nerves, which become through age ferruginous: on the stem they are two inches long, and an inch and half broad at the base; those on the branches are smaller, of different sizes, and some of them approaching to lanceolate: the flowers small for the size of the plant, disposed in a cyme: the peduncles round, smooth, usually two- or three-flowered, but sometimes one-flowered: the fruit an ovate capsule, assuming the appearance of a berry; at first yellowish green, then red or brownish purple, and lastly almost black when ripe. It is a native of the south of Europe.

The fourth species rises with a shrubby stalk six or seven feet high, dividing into branches at top: the leaves are oblong, set by pairs close to the branches, having a strong odour, but less than those of the fifth: the flowers terminating in clusters, very like those of the fifth. It is a native of the Canary islands, flowering from July to September.

The fifth rises with shrubby stalks three feet high, sending out small opposite branches at each joint: the leaves are oblong, ovate, placed by pairs, sessile, and having a rank smell: the flowers are in terminating bunches. It is a native of the south of Europe, flowering from July to September.

There are varieties, one larger, which is the common one: the other smaller.

The sixth has a root composed of many woody fibres, striking deep into the ground: the stems several, shrubby, near two feet high, covered with a purplish bark: the leaves stiff, smooth, about two inches long, and a quarter of an inch broad, opposite, sessile, of a lucid green on their upper surface, and gray underneath, having many transverse veins running from the midrib to the border: the flowers terminating in small clusters, each on a short peduncle. It is a native of China, flowering from March to September.

Culture.—The first and last sorts are more tender than the others, requiring the protection of the green-house in winter. They are capable of being increased by layers or cuttings. The former are made in the spring on the young shoots, which, when well rooted in the end of summer, may be taken off and planted out in separate pots. The cuttings of the young shoots may be planted in pots in the summer, and plunged in a hot-bed, and when well rooted, removed into separate pots.

the corolla longer than in the first sort: limb revolute, five-cleft, with unequal segments: the capsule clothed with the calyx, membranaceous, knobbed with the protuberant seeds, ovate, ventricose at bottom, marked with a depressed streak on each side: the receptacle fungose, scrobiculate, ovate-oblong, plano-convex, fixed on both sides to the partition: the seeds very numerous, small, compressed a little, incurved or kidney-form, closely scrobiculate, whitish ash-coloured. It is annual, and a native of the south of Europe, flowering in August.

It has the corolla varying with the base dark purple, or green.

The fourth species is a perennial plant (biennial), with weak stalks, which require support: the leaves are roundish, acutely indented on their edges, and on pretty long foot-stalks: the flowers come out at each joint of the stalk; they are large, and of a bright yellow, with a dark purple bottom: the style is much longer than the corolla: the stem is hairy, and about a foot high: the petioles very hairy: the leaves lobed, toothletted: the peduncles at the side of the petioles, erect with the flower, but quite bent down when in fruit: the outer lobe of the corolla is larger than the rest, and the lower sinus is cut beyond the limb, and there the purple stamens with the very long pistil issue and hang down. It is a native of Candia, flowering most part of the summer.

It varies in size and the shade of the colour in the corolla.

The fifth is an annual plant, a hand in height: the stem oblique, brittle, undivided, having long hairs: the lower leaves entire, upper oblong, toothed, alternate, sparingly hairy, on petioles of the same length with themselves: the peduncles short on the outmost stem, each from the axil of two opposite leaves: the calyxes turbinate, ten-angled, almost the length of the corolla, and broader than its tube, spiny at top: the corolla yellow, with a dark throat, divided on the lower side beyond the limb: the stamens declining. It is a native of Persia, flowering in July.

The sixth species has a perennial root: the stems a foot high, simple, erect, round, rough-haired: the leaves alternate, petioled, cordate, lucid-green, veined, rough-haired underneath, the upper ones gradually larger: the flowers in bundles, terminating, peduncled: the calyxes very short, five-toothed, rough-haired: the corollas purplish, funnel-form, upright: the stamens a little shorter than the corolla, converging: the style the same length with the corolla: the stigma capitate, emarginate, whitish. It flowers early in spring, and is a native of Siberia.

The seventh has also a perennial root, transverse, knobbed, thick, irregular, branched, flexuose, the thickness of the human thumb: the stem herbaceous, annual, upright, round, smooth (scarcely more than a foot high, according to some, but even three feet in height, according to others), the thickness of the human finger, trilid and bifid, with dichotomous branches: (the branches only two, according to Linnæus, spreading, and entirely simple; or, subtrichotomous, with a groove running down from the leaves:) the leaves ovate and oblong, the length of the human finger; the lower quite entire; the upper frequently moderately sinuate or repand: according to some, petioled, naked, somewhat wrinkled, spreading; on the stem alternate, solitary; under the forkings in threes; two of which approximate; on the branches alternate, but two together on the same tooth or base, one of which is a little less than the other: but, according to others, subovate or lanceolate, entire, except the lower ones, which in gardens at least are sinuate-toothed in front, veined, wrinkled, decurrent; the lower ones opposite, the rest scattered: the peduncles one-flowered, pendulous from the axils, weak, two inches long: the calyx smooth, five-toothed, permanent, wider than the fruit, and, as it were, inflated (bell-shaped, five-cleft, awnless): the corolla three times the length of the calyx, bell-shaped, slightly five-cleft, blunt, on the outside ferruginous, with a few pale streaks, within yellow, oblong, large, five-toothed, narrowing at the base into a short tube, yellowish purple, deciduous. It is a native of Idria in Friuli, flowering in the middle of April.

Culture.—They are all capable of being raised from seeds, by sowing them in the autumn in the situations where they are to stand. If the seeds be permitted to scatter, they also produce abundance of good plants.

In the fourth or shrubby sort, the seeds should be sown in pots, when perfectly ripened in the autumn, plunging them in a moderate hot-bed during the winter. When the plants have attained some growth in the spring, they should be removed into separate pots, and be replaced in the bed, due shade and water being given. It may also be increased by planting cuttings in a shady border of light earth, in the summer season, and when well rooted removing them into separate pots.

The only culture which the common sorts require is that of being kept clean from weeds, and properly thinned. The second sort succeeds best in a dry warm situation, or when planted in pots, and protected in the winter season. The fourth sort must be placed so as to have protec-

tion from frost in the winter season, and plenty of fresh air in mild weather.

All the sorts, except the second and fourth, may be introduced so as to afford variety in the borders and clumps of pleasure-grounds; but these two may be placed out among other more hardy potted sorts, or in collections of green-house plants, with good effect.

HYPERICUM, a genus furnishing plants of the shrubby and under-shrubby, hardy and tender kinds.

It belongs to the class and order *Polyadelphia Polyandria*, and ranks in the natural order of *Rotaceae*.

The characters are: that the calyx is a five-parted perianthium: segments subovate, concave, permanent: the corolla has five petals, oblong-ovate, obtuse, spreading, wheel-shaped, according to the sun's apparent motion: the stamina have numerous capillary filaments, united at the base in five or three bodies: anthers small: the pistillum is a roundish germ: styles three (sometimes one, two, or five), simple, distant, the length of the stamens: stigmas simple: the pericarpium is a roundish capsule, with the same number of cells as there are styles: the seeds very many and oblong.

The species cultivated are: 1. *H. balearicum*, Warted St. John's-wort; 2. *H. Ascyron*, Great flowered St. Peter's-wort; 3. *H. Androsæum*, Common Tutsan; 4. *H. Canariense*, Canary St. John's-wort; 5. *H. hircinum*, Stinking Shrubby St. John's-wort; 6. *H. monogynum*, Chinese St. John's-wort.

The first rises with a slender shrubby stalk in this country, about two feet high; but in its native soil it acquires the height of seven or eight feet, sending out several weak branches of a reddish colour, and marked with scars where the leaves have fallen off: the leaves are small, oval, waved on their edges, and having several small protuberances on their under side: they sit close to the branches, half embracing them at the base: the flowers are terminating, large, bright, yellow. It is a native of Majorca.

The second species has a stem a cubit and half high, round, smooth, rufescent: the leaves are pale green, paler underneath, an inch long and half an inch wide, roundish, opposite: the flowers terminating: calyx green: corolla pale yellow, five times as large as in the common sort. It is a native of the Pyrenees.

The third has a perennial, thick, woody root, of a reddish colour, sending out very long fibres: the stems suffruticose or under-shrubby, ancipital two-edged or slightly winged on opposite sides, two feet high and more, branched towards

the top, of a reddish colour, and smooth: branches brachiate or decussated, spreading: the leaves opposite, sessile, ovate, entire, smooth, dark green, glaucous on the under side, netted with numerous projecting veins and nerves, which become through age ferruginous: on the stem they are two inches long, and an inch and half broad at the base; those on the branches are smaller, of different sizes, and some of them approaching to lanceolate: the flowers small for the size of the plant, disposed in a cyme: the peduncles round, smooth, usually two- or three-flowered, but sometimes one-flowered: the fruit an ovate capsule, assuming the appearance of a berry; at first yellowish green, then red or brownish purple, and lastly almost black when ripe. It is a native of the south of Europe.

The fourth species rises with a shrubby stalk six or seven feet high, dividing into branches at top: the leaves are oblong, set by pairs close to the branches, having a strong odour, but less than those of the fifth: the flowers terminating in clusters, very like those of the fifth. It is a native of the Canary islands, flowering from July to September.

The fifth rises with shrubby stalks three feet high, sending out small opposite branches at each joint: the leaves are oblong, ovate, placed by pairs, sessile, and having a rank smell: the flowers are in terminating bunches. It is a native of the south of Europe, flowering from July to September.

There are varieties, one larger, which is the common one: the other smaller.

The sixth has a root composed of many woody fibres, striking deep into the ground: the stems several, shrubby, near two feet high, covered with a purplish bark: the leaves stiff, smooth, about two inches long, and a quarter of an inch broad, opposite, sessile, of a lucid green on their upper surface, and gray underneath, having many transverse veins running from the midrib to the border: the flowers terminating in small clusters, each on a short peduncle. It is a native of China, flowering from March to September.

Culture.—The first and last sorts are more tender than the others, requiring the protection of the green-house in winter. They are capable of being increased by layers or cuttings. The former are made in the spring on the young shoots, which, when well rooted in the end of summer, may be taken off and planted out in separate pots. The cuttings of the young shoots may be planted in pots in the summer, and plunged in a hot-bed, and when well rooted, removed into separate pots.

The last species may likewise be increased by planting slips of the roots in the spring, in the same manner.

They may also be raised by sowing the seed in pots, in the spring, and plunging them in a hot-bed just to bring up the plants.

The second and third sorts are readily increased by sowing the seeds in the autumn, in a bed of common earth, or where they are to remain.

They are, however, best raised by slipping the roots, and planting them, at the same time, where the plants are to grow.

The fourth and fifth sorts are easily increased by planting slips from the old roots in the autumn or spring, taken with root fibres to them; or by dividing the roots, and planting them where they are to grow, or in nursery rows.

They may likewise be increased by seeds, sown as in the two former species, removing them in the spring following to where they are to remain.

The two tender sorts afford variety in greenhouse collections, and the other sorts in the borders, clumps, and other parts of pleasure grounds.

HYSSOP. See **HYSSOPUS.**

HYSSOPUS, a genus affording a plant of the low under-shrubby perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved perianthium, cylindrical, oblong, striated, acutely five-toothed, permanent; the corolla one-petalled, ringent: the tube cylindrical, slender, the length of the calyx: throat inclined: upper lip straight, flat, short, roundish, emarginate: lower lip trifid: lateral segments shorter, blunt, the middle one cernate, obcordate, acute, with distant lobes: the stamina have four upright filaments, longer than the corolla, distant; the two upper ones shorter, but the two longer nearer to the lower lip: anthers simple: the pistillum is a four-parted germ: style filiform, under the upper lip, and of the same length: stigma bifid: there is no pericarpium: calyx fostering the seeds: the seeds four, subovate.

The species cultivated is: *H. officinalis*, Common Hyssop.

It has a woody, hard abiding root, the thickness of a finger: the stem very numerous, from a foot to eighteen inches high, shrubby, straight, not much branched; whilst tender square, but becoming round as they grow woody: the leaves numerous, narrow, smooth, entire, like those of Lavender, but much shorter, acute, dotted: whorls of flowers from the bosoms of the leaves, on two, many flowered peduncles, shorter than the leaf, directed one way, and continued into a spike. It is a native of the South of Europe, flowering in July and August.

There are several varieties, blue-flowered, white-flowered, red-flowered, long-spiked, with deep blue flowers, curled-leaved, striped-leaved.

Culture.—This plant may be increased by seed, slips, and cuttings.

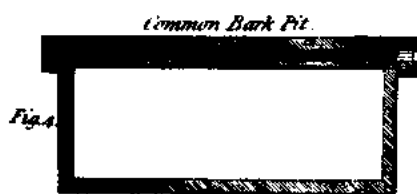
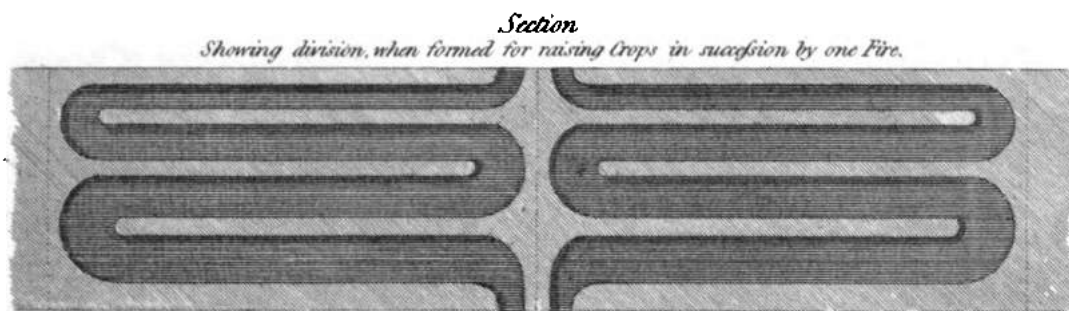
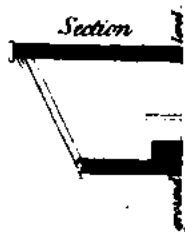
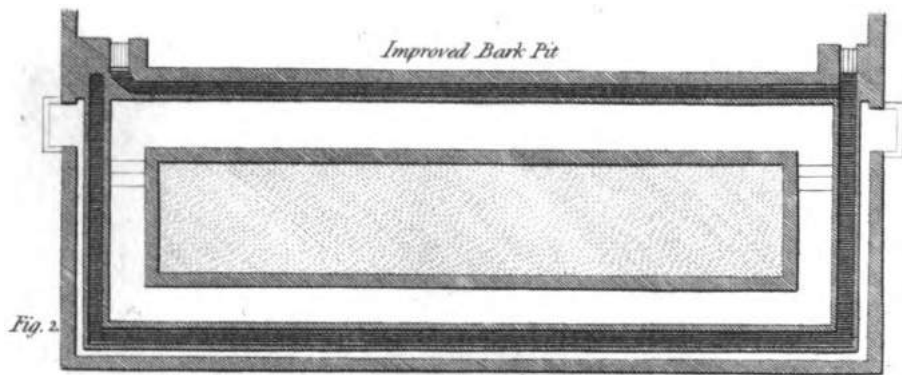
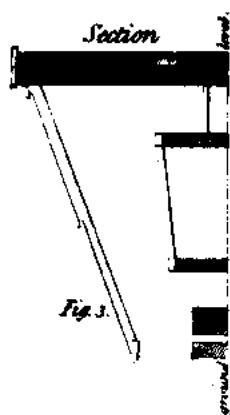
The seed should be sown in a bed or border of light earth in the spring, and raked in; and when the plants are come up, thin them if too close, and when about three or four inches high, plant them out where they are to remain. When it is designed to form an edging of them, the seed may be sown at once where the plants are to remain, in small drills, and covered half an inch deep.

In the latter methods, a quantity of the robust side-shoots should be slipped or cut off, planting them in a shady border five or six inches apart; giving water as soon as planted, and repeating it occasionally. They will soon strike root, and in autumn may be planted out where they are to stand.

The common blue-flowered kind is the sort chiefly used, which is generally cultivated, sometimes in close rows, by way of edgings to beds or borders, clipping them annually to keep them regular, and within due compass; and sometimes disposed in beds, &c. in rows fifteen or eighteen inches asunder, and the same distance between the plants in each row. The young leafy shoots and lower-spikes are the parts proper for use, and may be cut any time when wanted. The flower-stalks should be cut down for use in the summer, and tied in bunches.

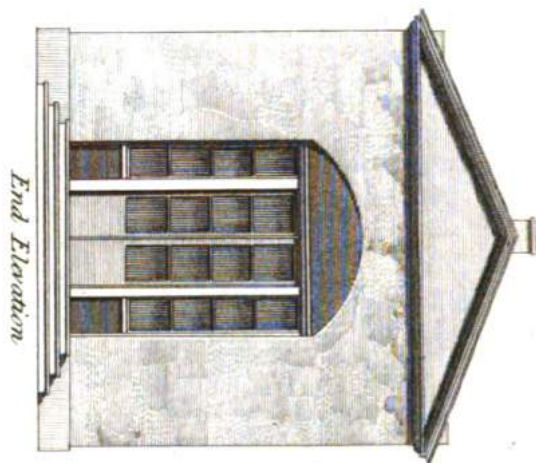
All the varieties may also be employed to adorn the borders, and other parts of the pleasure-ground, disposing them here and there singly to form bushy plants.

END OF THE FIRST VOLUME.

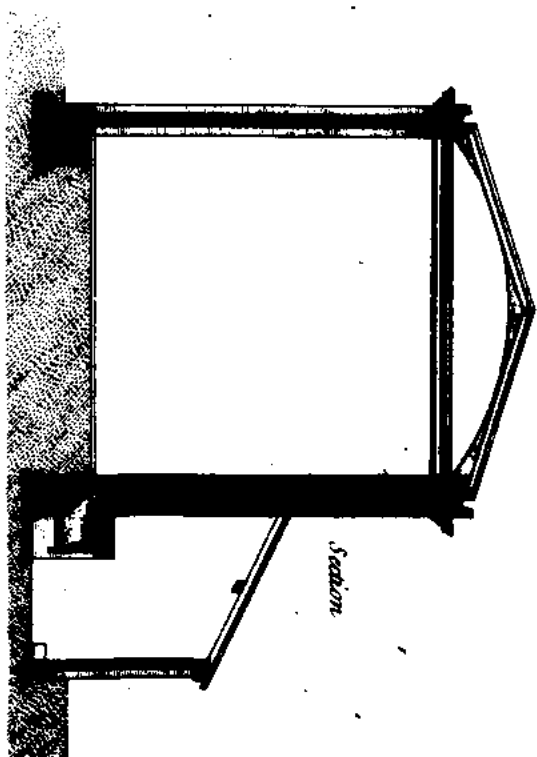


0 5 10 20 30 40 50 feet

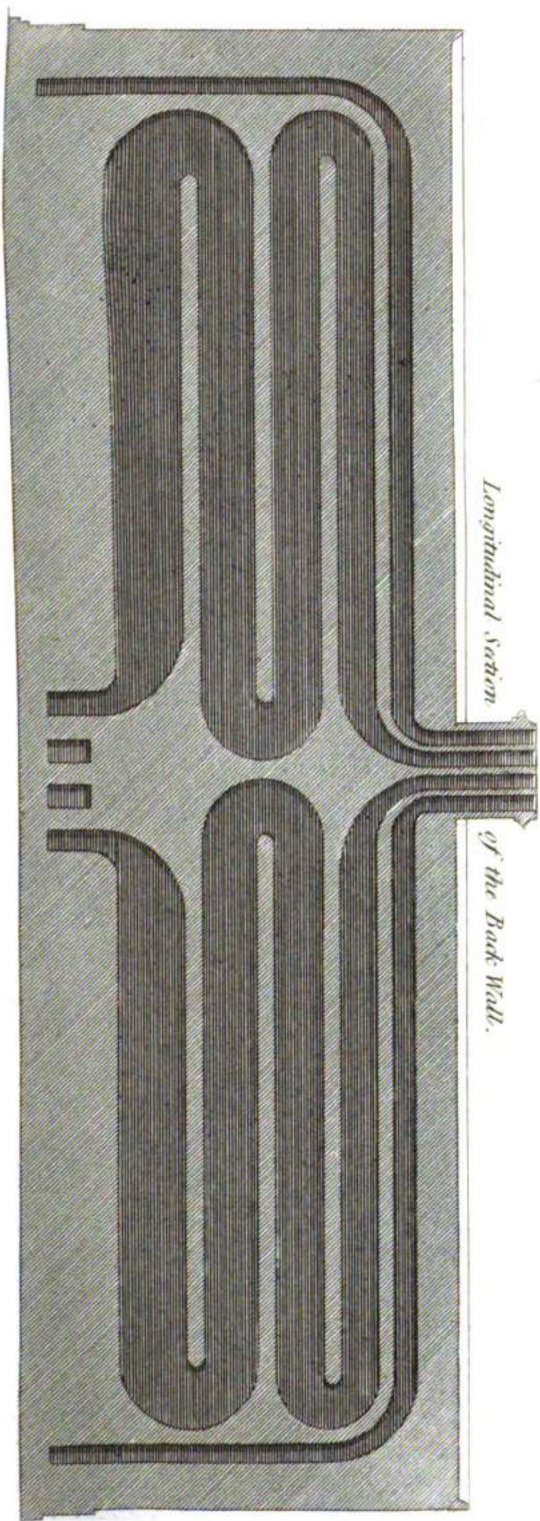
CONSERVATORY.



End Elevation



Section

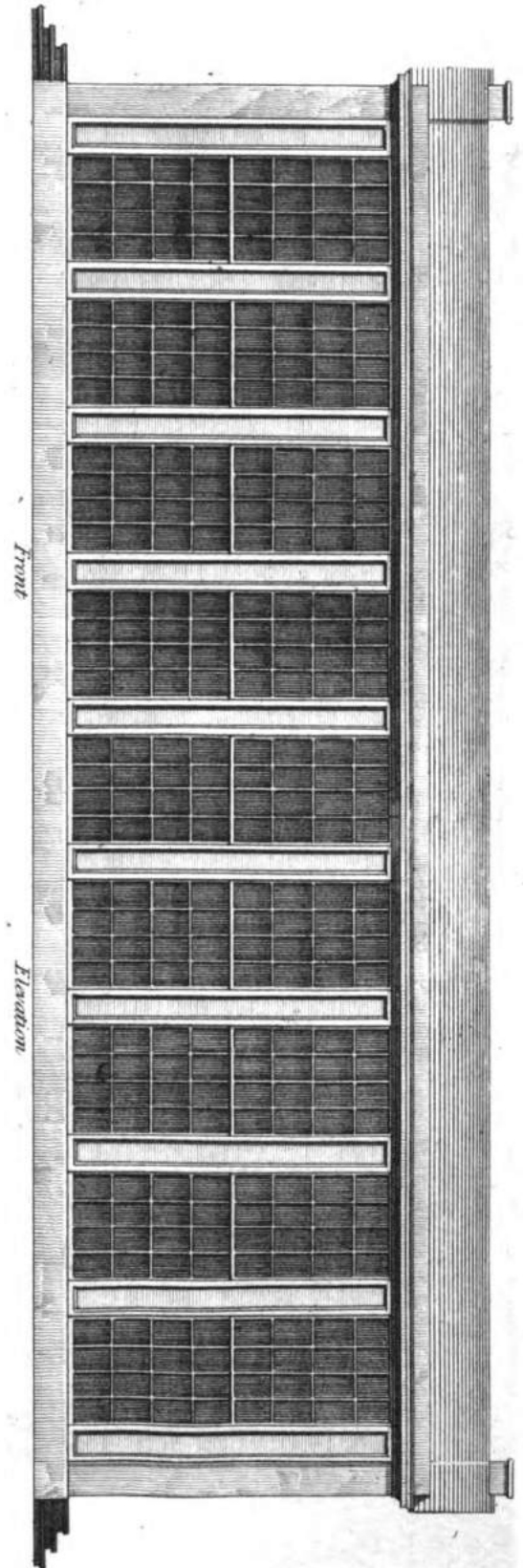


Longitudinal Section

of the Back Wall.

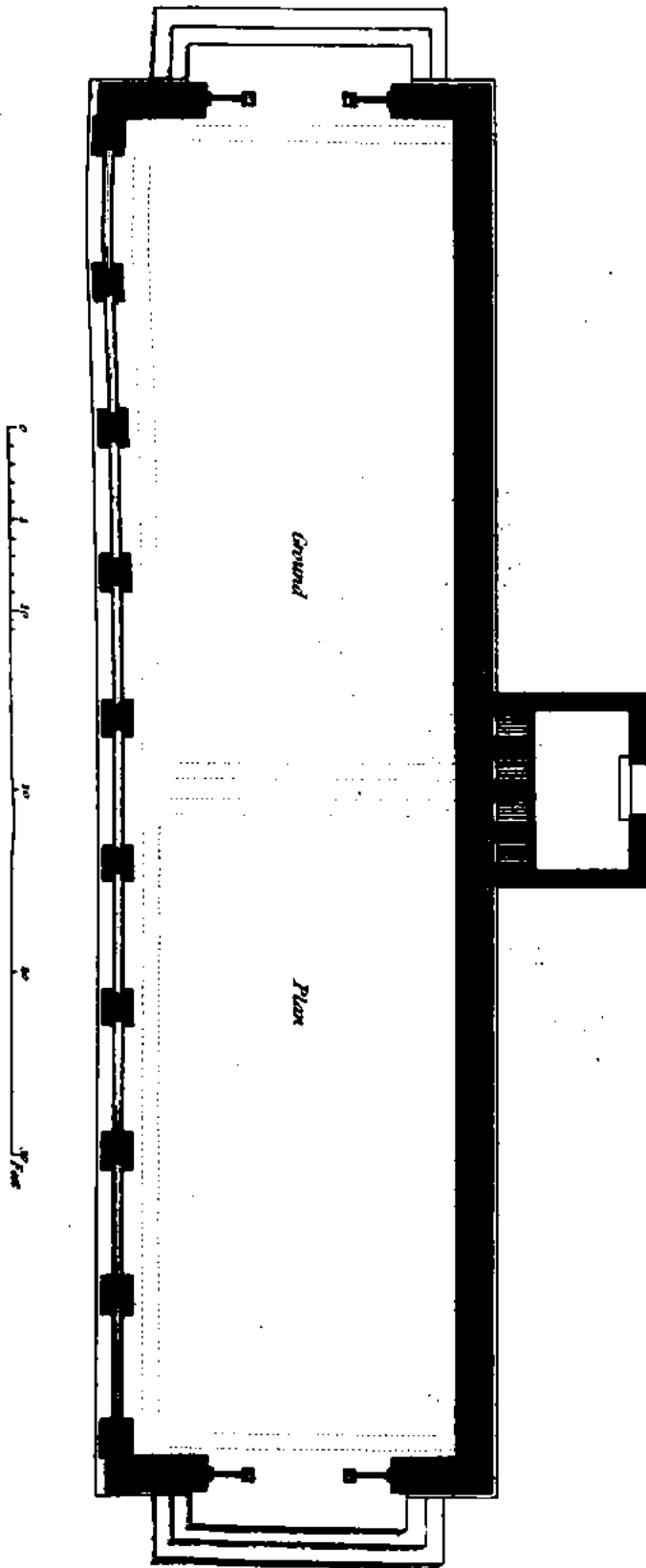
Scale of Feet
 0 1 2 3 4 5 6 7 8 9 10
 London, Published November 2, 1845, by W. Agnew & Sons, Strand

CONSERVATORY



Front

Elevation



Ground

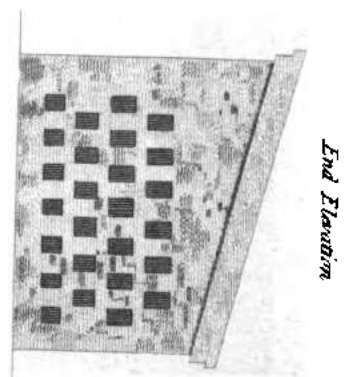
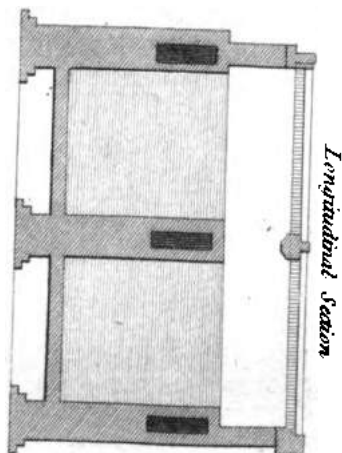
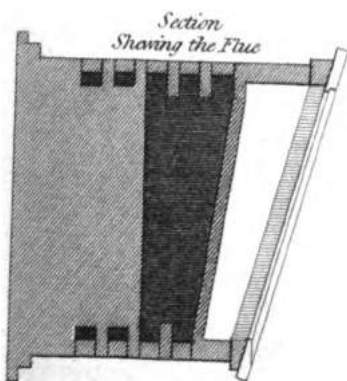
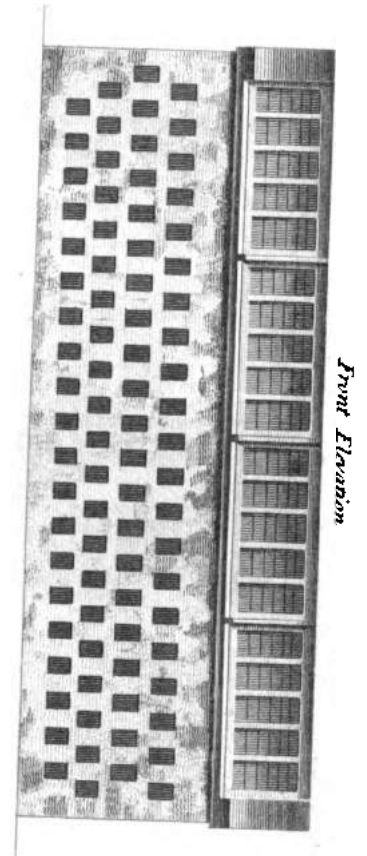
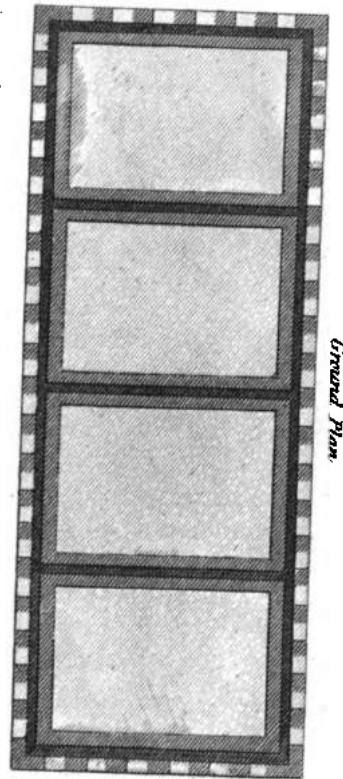
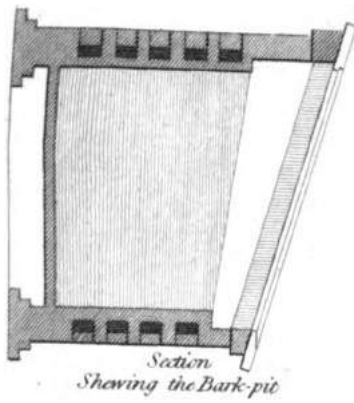
Plex

0 10 20 30 Feet

London: Published December 1855, by A. Knapp, Fleet Street.

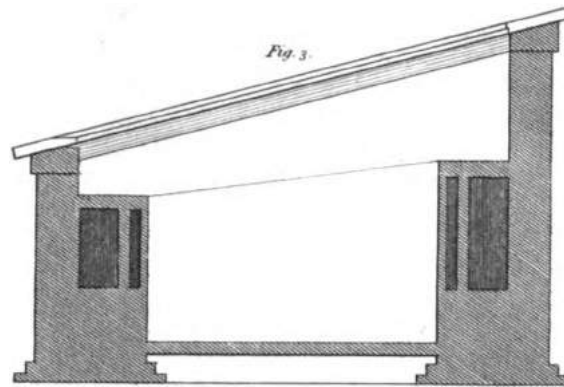
CUCUMBER FRAME.

Plate D.V. 11

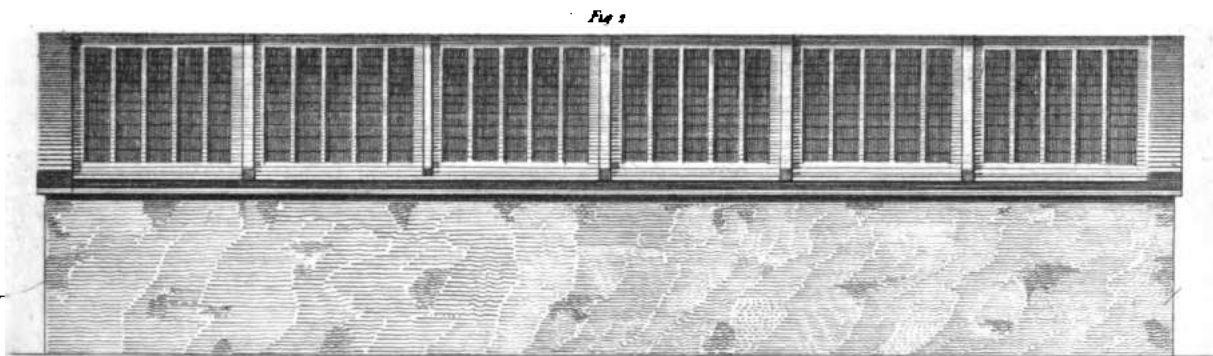


Published under the authority of the Board of Agriculture for England

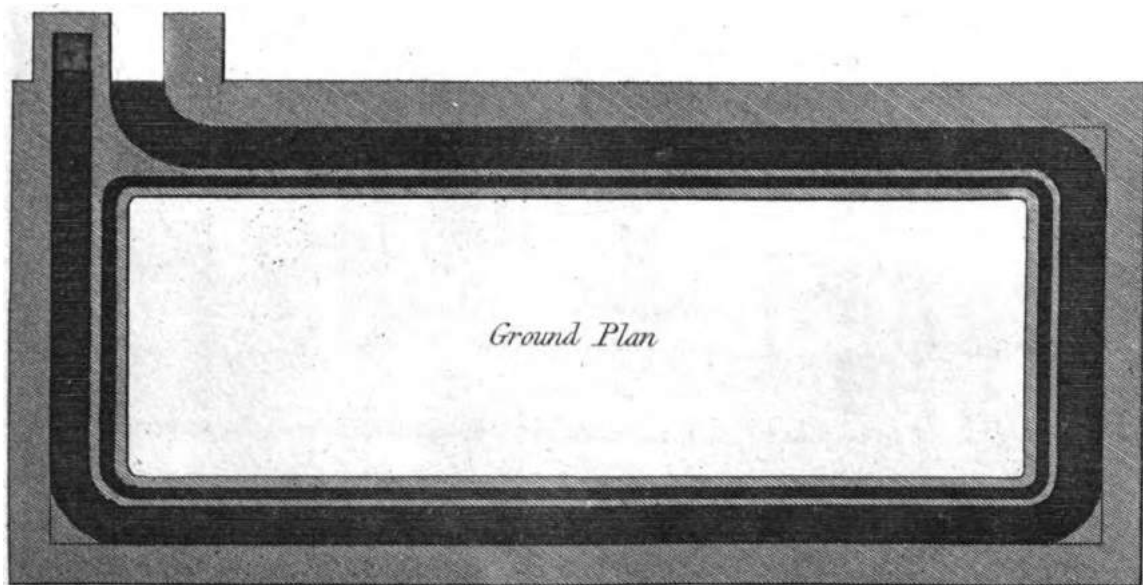
Drawn & Engraved by C. B. Jones



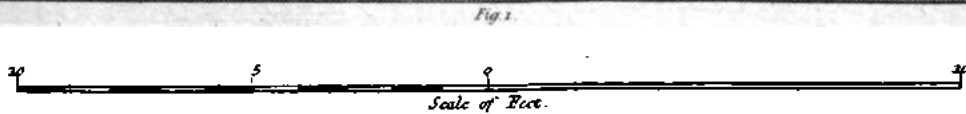
Section across the Bed



Front Elevation

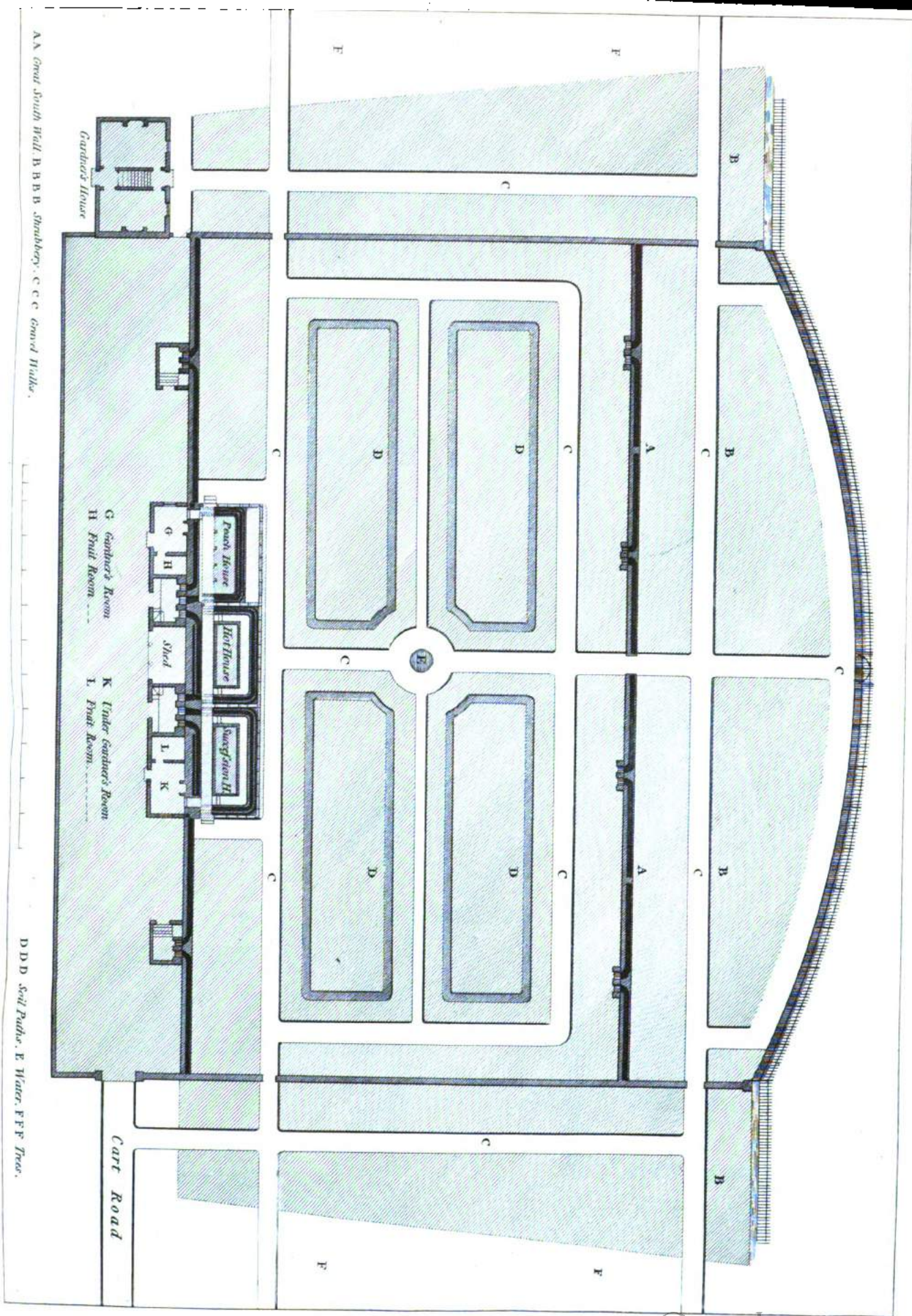


Ground Plan



GARDEN PLAN.

Plate F. To L.



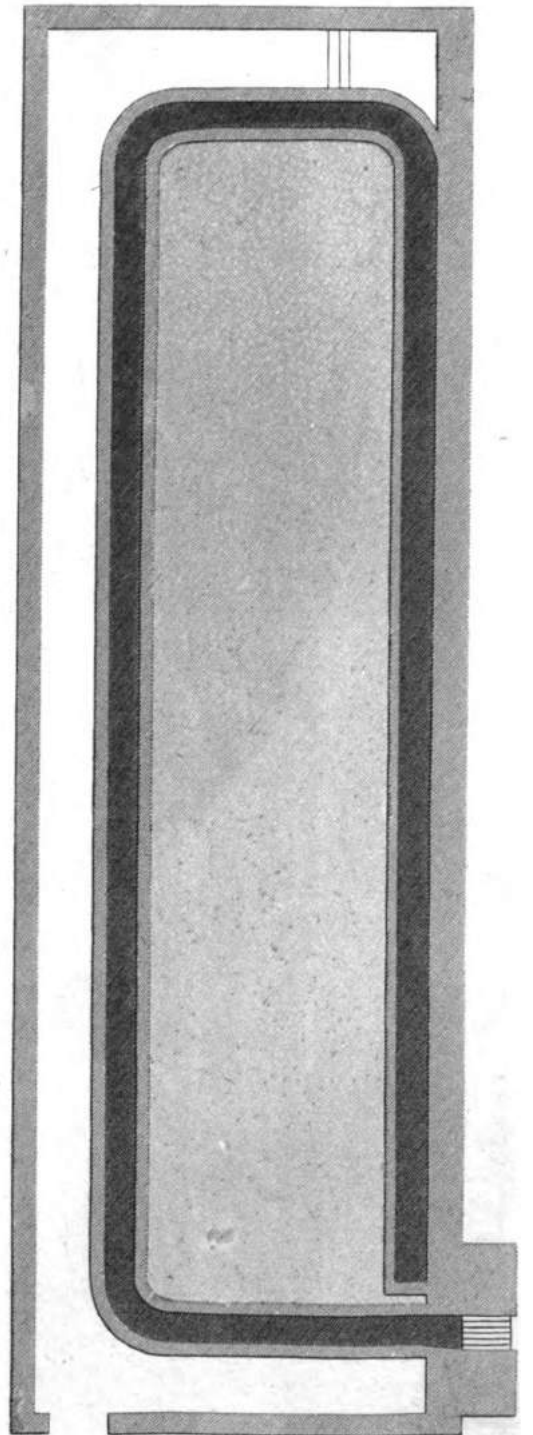


Fig. 2.

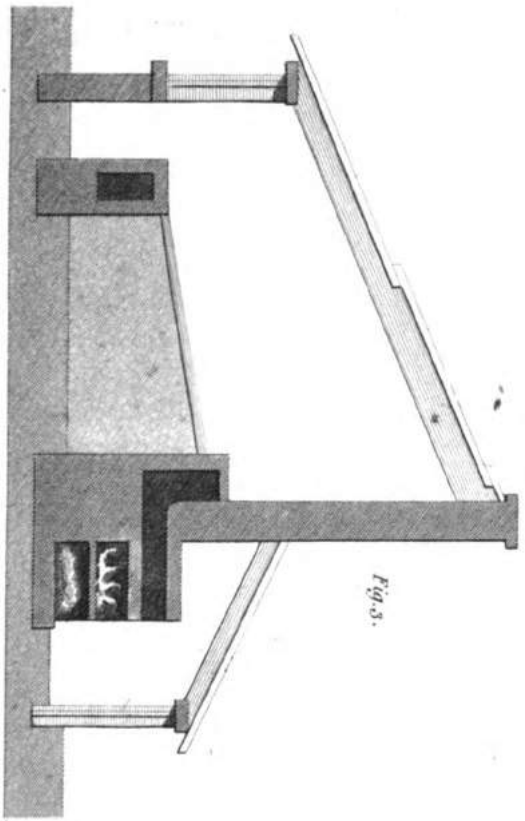


Fig. 3.

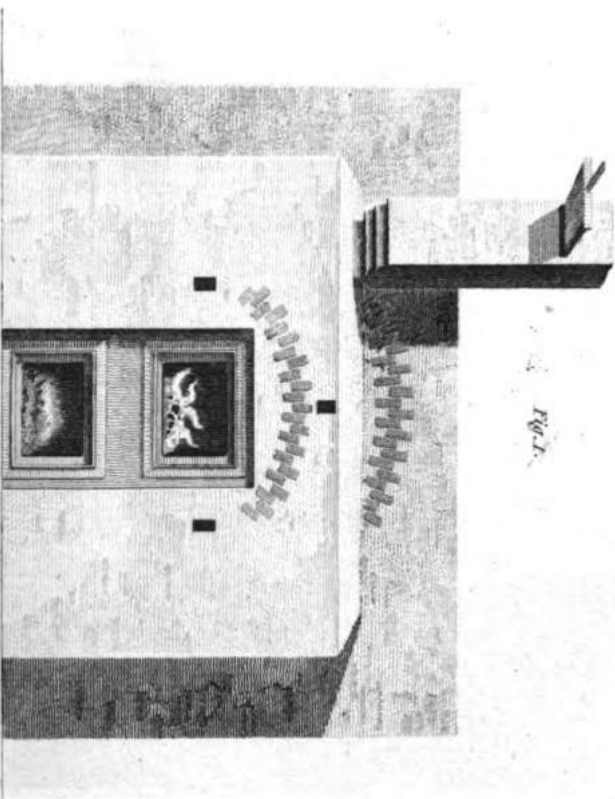


Fig. 1.

0 10 20 30 Feet

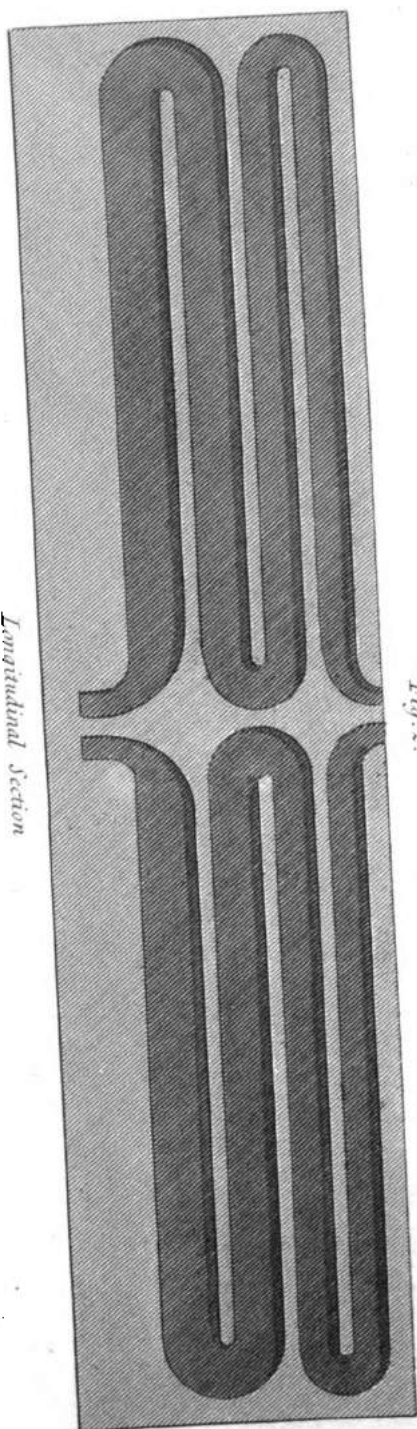
IMPROVED HOT HOUSE.

Published April 1, 1906, by G. Eganley, Fleet Street, London.

Drawn & Engineered by F. J. Shaw.

HOT WALL

Fig. 2.



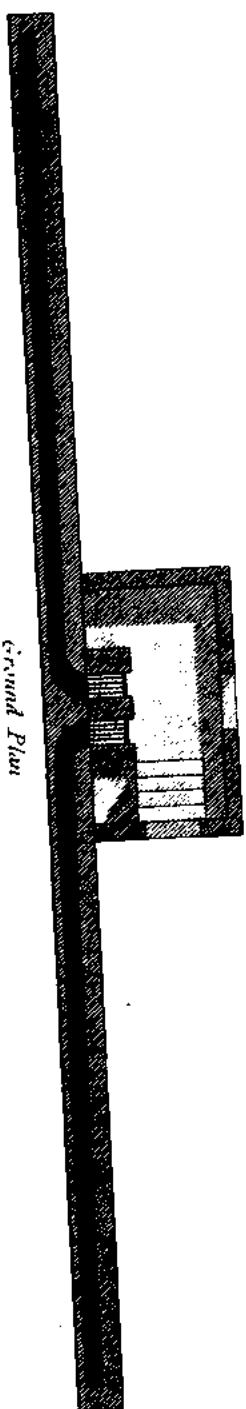
Longitudinal Section
showing the passage of the Flue.

Fig. 3.

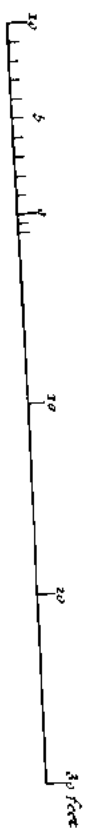


Section
across Wall.

Fig. 1.



Ground Plan
of Wall and Back Shed.



Published Nov. 1, 1906, by C. Knapley, Fleet Street, London.

Drawn & Engraved by C. Knapley.

A

GENERAL DICTIONARY

OF

PRACTICAL GARDENING, &c.

J A C

JACA TREE. See **ARTOCARPUS**.

JACK-IN-A-BOX. See **HERNANDIA**.

JACQUINIA, a genus containing plants of the shrubby exotic kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a five-leaved perianthium: leaflets roundish, concave, permanent: the corolla is one-petalled: tube bell-shaped, ventricose, longer than the calyx: border ten-cleft: divisions roundish, of which the five interior ones are shorter: the stamina have five awl-shaped filaments, arising from the receptacle: anthers spear-shaped: the pistillum is an ovate germ: style the length of the stamens: stigma headed: the pericarpium is a roundish acuminate berry, one-celled: the seed single, roundish, and cartilaginous.

The species cultivated are: 1. *J. armillaris*, Obtuse-leaved Jacquinia; 2. *J. ruscifolia*, Prickly Jacquinia.

The first is a very elegant upright shrub, seldom more than four or five feet high: the trunk round, thicker, and knobbed where the branches come out, covered with an ash-coloured bark: the branches four or five from each joint towards the top, in whorls, spreading, stiff, round, grooved, brittle, hoary, subdivided, and forming altogether a neat globular head: the leaves scattered, alternate, petioled, clustered towards the ends of the twigs, wedge-shaped, ovate, obtusely margined, quite entire, veinless, smooth, pale underneath, with very minute black dots:

VOL. II.

J A C

the racemes terminating, commonly shorter than the leaves, about two inches long, solitary, erect, loose, simple, seven-flowered, or thereabouts: the peduncles scattered, spreading, one-flowered: the flowers small, stiffish, white, smelling like Jasmine, and retaining their sweet scent several days. It is a native of South America, flowering in February and March.

The second species is a shrub three feet in height, having the habits of the first; but it differs in the leaves being lanceolate, acuminate, pungent, extremely stiff, and one-flowered. It is a native of South America, flowering in January and February.

Culture.—These plants are capable of being increased by sowing the seeds, procured from their native situation, in pots of light earth, in the spring season, plunging them in a bark hot-bed. When they have attained a few inches in growth, they must be removed into separate pots, and be replunged in a hot-bed in the stove, where they must be constantly kept.

They may likewise be raised by planting cuttings of the young shoots, in pots of the same sort of earth, in the early spring, plunging them in the bark hot-bed, as in the other case; but in this way they are raised with difficulty.

They afterwards require to be carefully managed, by having little water given in the winter time, but a free admission of air during the hot summer season, and occasional refreshings of water.

They afford variety in stove collections.

B

JASMINUM, a genus containing plants of the hardy and tender deciduous and evergreen shrubby kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiaria*.

The characters are: that the calyx is a one-leaved perianthium, tubulated, oblong: mouth five-toothed, upright, permanent: the corolla one-petalled, salver-shaped: tube cylindric, long: border five-parted, flat: the stamina have two short filaments: anthers small, within the tube of the corolla: the pistillum is a roundish germ: style filiform, length of the stamens: stigma bifid: the pericarpium is an oval berry, smooth, two-celled, or two-capsuled: the seeds two, large, ovate-oblong, arillated, convex on one side, flat on the other.

The species cultivated are: 1. *J. officinale*, Common White Jasmine; 2. *J. fruticans*, Common Yellow Jasmine; 3. *J. humile*, Italian Yellow Jasmine; 4. *J. odoratissimum*, Yellow Indian Jasmine; 5. *J. grandiflorum*, Spanish, or Catalonian Jasmine; 6. *J. Sambac*, Arabian Jasmine; 7. *J. Azoricum*, Azorian Jasmine.

The first has a shrubby, weak, climbing, round, smooth, branching stem: the leaflets usually seven, broad, lanceolate, quite entire, smooth, dark green, the end one larger and more pointed than the rest: the peduncles few-flowered: the calycine segments capillary: the corolla white and odorous: the flowers appear most part of summer. Its native country is not well ascertained; probably the East Indies.

It varies with white striped leaves, and with yellow striped leaves.

The second species has weak angular branches which require support, and rise to the height of eight or ten feet, if planted against a wall or pale: the leaves are trifoliate, simple, alternate: the flowers are yellow, coming from the sides and ends of the young branches. It is a native of the south of Europe. It sends out numerous suckers from the roots.

The third has shrubby firm stalks and angular branches, of low strong growth, and bushy: the flowers are generally larger than those of the preceding, but have very little scent, and are seldom produced so early in the season: the simple leaves are frequently intermixt with the ternate ones. Its native country is not known; but it flowers from July to September.

The fourth species rises with an upright woody stalk eight or ten feet high, covered with a brown bark, sending out several branches, which want no support: the leaflets are of a lucid green, ovate and entire, continuing green all the year, the two side ones much less than the

end one: the flowers are produced at the ends of the shoots in bunches, of a bright yellow colour, and a most grateful odour. It is a native of the island of Madeira, flowering from July to October and November, which are frequently succeeded by oblong oval berries.

The fifth has much stronger branches than the first sort: the leaflets are placed closer, and are of a lighter green; the side ones are obtuse, but the odd one ends in an acute point: the flowers are axillary, on peduncles two inches long, each sustaining three or four flowers, of a bluish red on their outside, but white within. It is a native of the East Indies, flowering from July to November.

The sixth species rises with a winding stalk to the height of fifteen or twenty feet, sending out many small branches: the leaves are smooth, near three inches long, and almost two broad, of a light green, on short foot-stalks, ending in acute points: the flowers are produced at the end of the branches, and also upon the side shoots, on short peduncles, each generally sustaining three flowers, the two lower opposite, and the middle one longer: these flowers are of a pure white, and have a most agreeable odour, somewhat like orange flowers, but sweeter; when fully blown they drop out of their cups upon being shaken, and frequently fall out in the night, changing soon to a purplish colour: the plants continue flowering great part of the year, when they are kept in a proper temperature of warmth. It is a native of the East Indies.

There are varieties of it with single and double flowers, and with large double flowers.

The seventh has longer slender branches, which require support, and may be trained twenty feet high: the leaves are of a lucid green, continuing all the year: the flowers terminating, in loose bunches, of a white colour, and very agreeable scent. It is a native of the Azores, flowering from May to November.

Culture.—The first sort is readily increased by layers or cuttings. The young branches should be laid down in the early autumn, and in the following autumn be taken off, and planted where they are to grow. The cuttings of the young shoots may be planted either at the same time or in the early spring, being protected in the first case, in severe weather, in the winter. When they are well rooted, they may be removed, with balls of earth about their roots, to the places where they are to grow.

The different varieties are increased by budding, or grafting them upon stocks of the plain or common kind. See **Budding** and **Grafting**.

The common sort must be planted against walls, pales, or other fences, that may serve as a support. When planted as a standard, it is difficult to train to a proper head, and keep in order, without destroying the flowering branches which are the extremities of the same year's shoots. On this account they should be permitted to take their natural growth in the summer, and not pruned or nailed till towards the latter end of March, when the frosts are over, to prevent their being injured by them.

The varieties should be planted in a warmer situation, with a southern aspect, than the common sort, especially the first, which, in very severe winters, should be protected with mats.

The second sort may be increased by layers, or planting the suckers taken from the roots, in the spring or autumn. The layers may be made as in the first sort.

The third sort is capable of being propagated either by budding or inarch-grafting upon stocks of the second kind, or by layers of the young tender branches made in the autumn or early spring seasons; but the former is the better practice, as producing more hardy plants. It should have a rather warm aspect, as a south wall, and, in very severe winters, have the protection of mats.

It requires the same pruning as the first sort.

The four following sorts are more tender.

The first of them may be increased by seeds or layers of the young shoots. The seeds should be sown in the early spring, in pots of fresh light earth, plunging them in a moderate hot-bed, and when the plants are up, removing them into a second hot-bed to forward them, giving them frequent slight refreshings of water, and gradually hardening them to the full air. They should be occasionally watered in the winter, and in the spring following be removed into separate pots, the earth being carefully preserved about their roots. Their first growth may be promoted by placing them in a mild hot-bed. They afterwards require a pretty free air, and slight protection from frosts in winter. They should have the decayed branches pruned out in the spring, without the others being shortened, as the flowers are produced at the extremities of the branches.

In the layer method the young shoots should be laid down in the early spring, as about March, being slightly nicked underneath at a joint, and often slightly watered in dry weather. In the following spring they may be taken off, and planted out in pots filled with light earth, separately; being afterwards managed as the others.

They may likewise be raised by inarch-grafting into stocks of the second species; but the plants produced in this way are not so strong as those upon their own stocks, and they are apt to send out too many suckers from the roots.

The second of these tender kinds may be raised by budding or inarch-grafting upon stocks of the first species, which renders it more hardy than on its own; but the plants are mostly brought from Italy, in bunches of four together, and which, after having their roots moistened, and the shoots and dead parts pruned away, as well as the tops cut down to within a few inches of the grafted parts, may be planted in pots filled with light fresh earth, plunging them in a moderate bark hot-bed, shading them from the sun, and giving them water. When they begin to grow, all the shoots below the grafts should be rubbed off, and the top shoots cut off, free air being admitted, so as to gradually harden them to be set out in a warm situation. They must have the protection of the green-house in winter, and be frequently sparingly watered, a free air being admitted in mild weather.

The third of these tender sorts may be raised by layers and cuttings; but the first is the best method, as the cuttings require much care to make them strike. The young branches should be laid down in the spring, in pots filled with soft loamy earth, plunging them in a tan hot-bed, and watering them occasionally. In the autumn, when they have stricken root, they should be taken off, and planted out in separate small pots, plunging them in a hot-bed, due shade being given. The cuttings may be planted in pots of the same sort of earth during the summer, plunging them in a tan hot-bed, and covering them close with a bell or hand glass, due shade being given, and occasional waterings. When they have taken good root, in the beginning of autumn, they may be removed into separate pots, and be managed as those from layers.

These plants succeed best when kept in the stove.

The last of these sorts may be increased in the same way as the fourth species, and requires the same management afterwards.

The three first species may be employed as plants of ornament for covering walls, palings, and other naked erections about houses, as well as occasionally introduced as standards in clumps, borders, and other parts of pleasure-grounds.

The other sorts afford variety among other potted green-house and stove plants. Some may likewise be trained against warm walls or palings, especially the last kind, which has a fine fragrance.

JATROPHA, a genus containing plants of the flowering shrubby perennial kind.

It belongs to the class and order *Monocotyledonae*, and ranks in the natural order of *Tricoccæ*.

The characters are: that in the male flowers the calyx is a scarcely manifest perianthium: the corolla one-petalled, funnel-form: tube very short: border five-parted: divisions roundish, spreading, convex, concave beneath: the stamens have ten awl-shaped filaments, approximated in the middle: the five alternate ones shorter, upright, shorter than the corolla: anthers roundish, versatile: the pistillum is a weak rudiment, latent in the bottom of the flower: female flowers in the same umbel with the males: calyx none: the corolla five-petalled, rosaceous: the pistillum is a roundish, three-furrowed germ: styles three, bifid: stigmas simple: the pericarpium is a roundish capsule, tricocous, three-celled, cells bivalve: the seeds solitary and roundish.

The species cultivated are: 1. *J. gossypifolia*, Cotton-leaved Physic-nut, or Wild Cassava; 2. *J. multifida*, French Physic-nut; 3. *J. manihot*, Eatable-rooted Physic-nut, or Cassava; 4. *J. wreni*, Stinging Physic-nut.

The first has the stem from two to three feet high, herbaceous, branched, smooth: the branches subdivided, round, beset at the base with branched glanduliferous cilia or bristles: the leaves are digitate, veined, tender, often three-lobed: lobes acute, serrate, toothed and ciliate; cilia glandular: the common peduncle terminating: partial cymed, bifid: male flowers very copious, females solitary, in the forks of the peduncles: in the males, calyx five-leaved: leaflets ovate, acute, ciliate: corolla deeply five-parted, dark purple: segments ovate: at the base of the stamens are five roundish nectareous glands. It is a native of the West Indian islands.

The second species grows generally to the height of five, six, or seven feet, with a very smooth suffrutescent stem, and spreading branches: the stipules bristle-shaped, multifid at the base of the branches and petioles: the leaves alternate, subpeltate, multifid: the divisions pinnate, with the odd leaflet longer, smooth, but whitish underneath: the peduncles terminating, very long, round, thick, very smooth, subdivided: the pedicels coloured, in corymbs: the flowers small, red: males very numerous: females solitary, subsessile. It is common in most of the islands in the West Indies, flowering from June to July.

The third shoots from a tough, branched, woody root, whose slender collateral fibres

swell into those fleshy conic masses for which the plant is cultivated; and rises by a slender woody knotted stalk to the height of four, five, or six feet, sometimes more: the leaves alternate, smooth, on long petioles, seven-lobed: lobes narrow at the base, growing broader till within an inch and half of the top, where they diminish to an acute point: the three middle lobes are about six inches long, and two broad where broadest; the two next are about an inch shorter, and the two outside lobes are not more than three inches long; the middle lobes are sinuated on each side near the top, but the two outer are entire: the flowers are produced in umbels at the top of the stalks, some male, and others female. It is a native of South America.

It is observed by Martyn, that "it grows to perfection in about eight months; but the roots will remain a considerable time in the ground uninjured. They are generally dug up as occasion requires, and prepared for use in the following manner: being first well washed and scraped, then rubbed to a pulpy farina on iron graters, they are put into strong linen or palm-etto bags, and placed in a convenient press, until the juice is entirely expressed: the farina is then taken out and spread in the sun for some time, pounded in large wooden mortars, run through coarse sieves, and afterwards baked on convenient irons. These are placed over proper fires, and, when hot, bestrewed with the sifted meal to whatever size or thickness people please to have the cakes made: this agglutinates as it heats, grows gradually harder, and, when thoroughly baked, is a wholesome well-tasted bread. *Tapioca* is also prepared from this root."

The fourth species has a thick, swelling, fleshy root, from which arises an herbaceous stalk as big as a man's thumb, four or five feet high, and dividing into several branches; these are very closely armed with long brown spines: the foot-stalks of the leaves are six or seven inches long, which are also armed with spines, but not so closely, nor are the spines so long as those on the stalk and branches: the leaves are deeply cut into five lobes, which are jagged deeply on their sides, and the nerves are armed with stinging spines: the flowers are produced in umbels at the top of the branches, standing upon long naked peduncles; they are of a pure white colour: the male flowers appear first; they are five-petalled, forming a short tube at bottom, and spreading open flat above. It is a native of Brazil, flowering from May to July.

Culture.—These plants are all capable of being increased by seeds and cuttings.

The seeds should be sown in the early spring, in pots of light earth, plunging them in a mild hot-bed of bark. When they have attained a little growth, the plants should be pricked out into separate small pots, and be replunged in the hot-bed, a little water being given.

The cuttings should be made from the stalks or young branches five or six inches in length, and planted in pots of light earth in the spring or summer months, plunging them in the bark hot-bed. When they have stricken good root they should be removed with earth about their roots into separate pots, and be replunged in the hot-bed, being duly watered and shaded.

The third sort, or the Cassava, according to Martyn, "thrives best in the West Indies, in a free mixed soil where it is propagated by the bud or gem, in the following manner: The ground is first cleared, and hoed up into shallow holes, of about ten or twelve inches square, and seldom above three or four inches in depth. When they intend to plant, they provide a sufficient number of full-grown stems, and cut them into joints, of about six or seven inches length, as far as they find them tough and woody, and well furnished with prominent, well-grown, hardy buds: of these they lay one or two in every hole, and cover them over with mould from the adjoining bank; but care must be taken to keep the ground clean, until the plants rise to a sufficient height to cover the mould, and to prevent the growth of all weaker weeds."

This root, though of a poisonous quality, serves for bread to the inhabitants of the West Indies, when divested of this property, which is done by rubbing the root forcibly upon a strong copper grater, till reduced to a rough saw-dust-like powder, or meal: it is then put into a press to squeeze out the poisonous juice; and, being sufficiently pressed and sifted, is made into bread, by spreading it two or three inches thick, upon an iron plate heated over the fire; and thus the parts join, incorporate, and become cake bread, which is accounted very nourishing.

They all require to be sparingly watered in the winter season, to prevent their rotting; and to be kept constantly in the stove, where they afford variety, and a fine appearance in their large foliage and flowers.

IBERIS, a genus containing plants of the herbaceous, annual, perennial, and under-shrubby kinds.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliculosæ*, or *Cruciformes*.

The characters are: that the calyx is a four-

leaved perianthium: leaflets obovate, concave, spreading, small, equal, deciduous: the corolla is four-petalled, unequal: petals obovate, obtuse, spreading: claws oblong, upright: of these the two exterior petals are far larger, and equal to each other: the two interior very small, reflex: the stamina have six awl-shaped filaments, upright: of which the two lateral ones are shorter: anthers roundish: the pistillum is a roundish, compressed germ: style simple, short: stigma obtuse: the pericarpium is an upright, suborbiculate, compressed silicle, emarginate, surrounded by a sharp edge, two-celled: partition lanceolate: valves navicular, compressed, carinated: the seeds a few, and subovate.

The species are: 1. *I. umbellata*, Purple Candy-tuft; 2. *I. amara*, White Candy-tuft; 3. *I. linifolia*, Flax-leaved Candy-tuft; 4. *I. odorata*, Sweet-scented Candy-tuft; 5. *I. rotundifolia*, Round-leaved Candy-tuft; 6. *I. semperflorens*, Broad-leaved Evergreen Candy-tuft; 7. *I. sempervirens*, Narrow-leaved Evergreen Candy-tuft; 8. *I. Gibraltarica*, Gibraltar Candy-tuft.

The first has an annual root, white, oblong, fusiform: the stem upright, leafy, half a foot, or from a span to a foot in height, subangular, green, smooth, branching: the leaves are frequent, alternate, lanceolate, acuminate, smooth: the flowers in a hemispherical corymb, on peduncles half an inch in length, of a pale purple colour. It is a native of the south of Europe, flowering in June and July.

There are varieties with bright purple flowers, and with white flowers.

The second species resembles the first very much, but is smaller: the stem is seven or eight inches high, pubescent, somewhat rugged, branched: branches diffused, alternate, the lower ones sometimes opposite, not rising all to the same height: the leaves are alternate, oblanceolate, or linear-lanceolate, blunt, sessile, decurrent, bright green, thickish, smooth, the lower ones serrate, the rest toothletted, especially in front, or with a tooth or two on each side: the flowers white, in a terminating spike-like raceme; or rather, in a corymb lengthened into a raceme as the inflorescence advances. It is a native of Switzerland, &c.

The third has a simple, white, twisted root, having few fibres: the root-leaves lanceolate-linear, serrate, withering and falling as the stem advances: stem-leaves linear, quite entire, sessile, few, gradually shorter, sharpish: the stem herbaceous, straight, slender, branched at top: branches mostly bifid: the flowers of a purple colour, in corymbs, the outer ones peduncled,

with the two other petals larger. It is a native of Spain, &c. and is annual, flowering in July.

The fourth species seldom grows so large as the first, and the flowers are much smaller, but have an agreeable odour. They are in close corymbs and are of a snowy whiteness. It is a native of Geneva.

The fifth has a creeping stem; the leaves are smooth, soft; those next the root quite entire and petioled, those on the stem smooth and entire: the flowers are reddish purple, almost regular, in racemes, on spreading peduncles. It is a native of Switzerland, flowering from May to July.

The sixth species is a low shrubby plant, which seldom rises above a foot and half high, having many slender branches, which spread on every side, and fall towards the ground if they are not supported. These branches are well furnished towards their extremity with leaves, which continue green all the year; and in summer the flowers are produced at the end of the shoots, are white, and grow in an umbel, continue long in beauty, and, being succeeded by others, the plants are rarely destitute of them from the end of August to the beginning of June. It is a native of Persia, &c.

There is a variety with white striped leaves.

The seventh is of humbler growth than the sixth, seldom rising more than six or eight inches high, the branches rather herbaceous: the leaves continue green through the year, and the flowers are of as long duration as those of the sixth species. It is a native of the Island of Candia, flowering from April to June.

In the eighth species the stems are many, thick, green, striated, ascending from a foot to eighteen inches in length, divided into several branches: the leaves alternate, gradually widening from a narrow base, ending in a blunt point, thick, smooth, veinless except in the middle, dark green above, somewhat paler underneath: the flowers terminating in corymbs, at first white, afterwards pale purple, without scent. It is a native of Spain, flowering early in the spring.

The stems are ridged and woody, and the leaves larger and less bluntly toothed in the cultivated plant. The flowers are also twice as large.

Culture.—The four first annual sorts must be raised annually from seed, by sowing it at different times in the spring, in patches, in the fronts of borders, clumps, and other parts of pleasure-grounds, where the plants are to flower, thinning them properly afterwards.

The fifth sort may be raised by planting the root off-sets and cuttings as below.

The three shrubby perennial sorts may be increased by slips and cuttings, which should be planted out in pots, plunging them in a moderate hot-bed, or in a warm shaded border in the later spring and early summer months, water being occasionally given. When well rooted in the autumn, they should be removed into pots, being protected in the winter season in the green-house.

The first sorts are very ornamental in the open ground, when properly varied. And the latter in green-house, and other potted collections. A few of them may likewise be set out in the warm shrubby borders.

IBISCUS. See **HIBISCUS**.

ICACO. See **CHRYSORALANUS**.

ICE-HOUSE, a sort of building sunk in the ground for the purpose of preserving Ice in for use in the summer season.

The proper situation for an Ice-House, is that of a dry spot of ground; as wherever there is moisture, the Ice will be liable to dissolve: of course in all strong soils, which retain the wet, too much care cannot be taken to make drains all round the houses to carry off moisture; as when this is lodged near them, it will occasion a damp, which is always prejudicial to the keeping of Ice.

The places should likewise be elevated, that there may be descent enough to convey off any wet that may happen near them, or from the Ice melting; and also, as much exposed to the sun and air as possible; not under the drip, or in the shade of trees, as is too often the practice, under the supposition, that if exposed to the sun, the Ice will melt away in summer, which never can be the case where there is sufficient care taken to exclude the external air, as the heat of the sun can never penetrate through the double arches of the buildings, so as to add any warmth to the internal air; while, when entirely open to the sun and wind, all damps and vapours are readily removed.

The form of the building may be according to the fancy of the owner; but for the well into which the Ice is put, a circular form is the most convenient; the depth and diameter of it being proportioned to the quantity of Ice wanted; but it is always best to have sufficient room, as when the house is well built, it will keep the Ice two or three years: and there will be this advantage in having it large enough to contain Ice for two years consumption, that, if a mild winter should happen, when there is not Ice to be had, there will be a stock to supply the want in the House.

Where the quantity wanted is not great, a well of six feet diameter, and eight feet deep, will be large enough; but for a large consump-

tion, it should not be less than nine or ten feet diameter, and as many deep: where the situation is either of a dry chalky, gravelly, or sandy kind, the pit may be made entirely below the surface of the ground; but in strong loamy, clayey, or moist ground, it will be better to raise it so high above the surface, as that there may be no danger from the wetness of the soil.

At the bottom of the well there should be a space about two feet deep left, for receiving any moisture which may drain from the Ice, and a small underground drain should be laid from this, to carry off the wet; over this space should be placed a strong grate of wood, to let the moisture fall down, which may at any time happen, from the melting of the Ice. The sides of the well must be walled up with brick or stone at least two feet thick; but if it be thicker it will be better, as the thicker the walls are made, the less danger there is of the well being affected by external causes. When the wall of the well is brought within three feet of the surface, there must be another outer arch or wall begun, which must be carried up to the height of the top of the intended arch of the well; and if there be a second arch turned over from this, it will add to the goodness of the House; but this must depend on the person who builds going to the expense. When not, the plate into which the roof is to be framed must be laid on this outer wall, which should be carried high enough above the inner arch to admit of a door-way in, to get out the ice. Where the building is to be covered with slate or tiles, there should be a thickness of reeds, straw, or other similar material laid under, to guard against the effects of the sun and external air; where they are laid two feet thick, and plastered over with lime and hair, there will be no danger of the heat penetrating.

The external wall of the house need not be built circular, but of any other form, as square, hexangular, or octangular; and where it stands much in sight, may be so contrived as to make it a pleasing object.

Ice-Houses may be built in such a manner as to have alcove seats in the front, having passages to get out and put in the Ice behind them; or the entrance may be behind, to the north; small passages being left next the seats, through which to enter to take out the Ice, a large door being contrived with a porch wide enough for a small cart to back in, to shoot down the ice upon the floor near the mouth of the well, where it may be well broken before it is put down. The aperture of this mouth of the well need not be more than two feet and a half in diameter, which will be large enough to put down the ice, a stone being left to stop it, which must be closed up as securely as possible after the ice is put in,

and all the vacant space above and between this and the outer door be filled close with barley straw, or other similar material, to exclude the external air.

The door to enter for taking out the ice should be no larger than is absolutely necessary for the coming at the ice, and must be strong and close to exclude the air; and at five or six feet distance from this another door should be contrived, which should be closely shut before the inner door is opened, whenever the ice is taken out of the House.

When the House is thus finished, it should have time to dry before the Ice is put into it; as when the walls are green, the damp of them frequently dissolves the Ice. And, at the bottom of the well, upon the wooden grate, some small faggots should be laid; and if upon these a layer of reeds be placed smooth for the Ice to rest upon, it will be better than straw, which is commonly used. In the choice of the Ice, the thinner it is the better it may be broken to powder; as the smaller it is broken the better it will unite when put into the well. In putting it in, it should be rammed close, and a space left between it and the wall of the well, by straw being placed for the purpose, so as to give passage to any moisture that may be collected by the dissolving of the Ice on the top or other-ways.

In putting the Ice into the House, some mix a little nitre with it, to make it congeal more fully; but this is not necessary.

As the Ice becomes solid in the well, an iron crow is necessary to take it up with.

The Ice-House is, as has been seen, capable of being made an ornamental building; but this is seldom done; it being generally placed in a sequestered spot, on the side of a hill or sloping ground, the base of which is lower than the bottom of the well; the outside being well banked up with earth, to keep out all external air and heat, and neatly covered with turf.

In the annexed plate is the plan of an improved Ice-House.

Fig. 1. is a section in the direction of the entrance passage.

- A. Upper covering of earth.
- B. and K. Strata of clay.
- C. Wall of the arched roof of passage.
- D. Entrance passage.
- E. Entrance aperture of the well.
- F. Well.
- G. Side-walls of well, and the cavities of it for the retention of the warm air, which would otherwise make its way to the well.
- H. Pipe for carrying off the water or moisture.
- I. Drain of it.
- L. Door of passage.

Fig. 2. Plan of the well on the level of the passage floor.

Fig. 3. Ground plan of the well.

Fig. 4. Front elevation of the entrance.

N. B. In figures 2, 3, and 4, the letters of reference are placed to the same parts of the building respectively, as in fig. 1.

ICE-PLANT. See MESEMBRYANTHEMUM.

JERUSALEM ARTICHOKE. See HELIANTHUS.

JERUSALEM SAGE. See PHLOMIS.

ILEX, a genus containing plants of the hardy evergreen tree or shrubby kinds.

It belongs to the class and order *Tetrandria Tetragynia* (*Polygamia Dioecia*), and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a four-toothed perianthium, very small, and permanent: the corolla one-petalled, four-parted, wheel-shaped: divisions roundish, spreading, rather large, with cohering claws: the stamina have four awl-shaped filaments, shorter than the corolla: anthers small: the pistillum is a roundish germ: style none: stigmas four, obtuse: the pericarpium is a roundish berry, four-celled: the seed solitary, bony, oblong, obtuse, gibbose on one side, cornered on the other.

The species cultivated are: 1. *I. aquifolium*, Common Holly; 2. *I. Cassine*, Dahoon Holly; 3. *I. vomitoria*, South-sea Tea, or Evergreen Cassine.

The first rises from twenty to thirty feet, and sometimes more; but its ordinary height is not above twenty-five feet. The trunk is covered with a grayish smooth bark, and those trees which are not lopped or browzed by cattle, are commonly furnished with branches the greatest part of their length, and form a sort of cone: the leaves are petioled, about three inches long, and one and a half broad, of a lucid green on their upper surface, and pale on their under, having a strong midrib; the edges are indented and waved, with sharp stiff thorns terminating each of the points, some raised upwards, others bent downwards, being fixed into a strong woody border, which surrounds the leaf. When this tree grows naturally, it has flat, entire leaves, without thorns, only ending in a sharp point, mixed with the others, especially as it advances in age: the flowers in clusters from the base of the petioles (from a sort of scale upon the branch) on very short peduncles, each sustaining five, six, or more flowers (generally three together), appearing in May. They are succeeded by roundish berries (crowned with the calyx, which turns black), turning to a beautiful scarlet about Michaelmas, and continuing the greatest part of the winter.

There are a great many varieties of both the

green-leaved and variegated sorts. Of the first the Common Green-leaved Prickly, the Smooth Green-leaved, the Narrow Serrated Green-leaved, the Green-leaved Yellow-berried, the Box-leaved Green, the Hedgehog Green; and of the latter, the Common Prickly, with Silver-striped Leaves, with Gold-striped Leaves, with Blotched Leaves, the Smooth with White-striped Leaves, with Yellow-striped Leaves, with Blotched Leaves, with Narrow-striped Leaves, the Blotched Yellow berried, the Cream-coloured, the Copper-coloured, the White-leaved, the Mottled-edged, the Hedgehog Silver-edged, the Gold-edged Hedgehog, the White Blotched Hedgehog, the Yellow Blotched Hedgehog, the Painted Lady variegated.

The second species rises with an upright branching stem to the height of eighteen or twenty feet; the bark of the old stems is of a brown colour, but that of the younger stems or branches green and smooth: the leaves more than four inches long, and one and a quarter broad in the broadest part, of a light green and thick consistence; the upper part is serrate, each serrature ending in a small sharp spine; they stand alternately on every side of the branches, on very short foot-stalks: the flowers come out in thick clusters from the side of the stalks; they are white, and shaped like those of the first, but smaller. Both the female and hermaphrodite flowers are succeeded by small roundish berries, making a fine appearance in winter; but they have not yet produced fruit in this climate. It is a native of Florida and Carolina.

There are varieties, as with broad leaves, and with narrow leaves, with scarcely any serratures.

The third rises to the height of ten or twelve feet, sending out branches from the ground upwards, which form themselves into a sort of pyramid: the leaves are about the size, shape, texture, and colour of the small-leaved alaternus, but somewhat shorter, and a little broader at the base: the flowers are produced in close whorls at the joints of the branches, near the foot-stalks of the leaves: they are white, and are succeeded by bright red berries, which continue upon the plants most part of the winter, and make a fine appearance, intermixed with the green leaves. It is a native of West Florida.

Culture.—These plants are all capable of being increased from seeds, and by the operations of budding and grafting.

The seeds or berries should be sown as soon as they are perfectly ripened, in small beds prepared for the purpose. But as they are long in germinating, it is the practice with some to deposit them for a year before they are sown in

the beds, in pots filled with earth or sand, or in a hole in the earth, in a dry situation; the first is probably the best method.

The plants mostly rise in the second spring, when they should be kept well weeded and watered.

After they have had two years' growth in these beds, they should be removed, and planted out in nursery rows at the distance of two feet, and one apart in the rows. They should remain in these till of proper size to be planted where they are to remain, keeping them perfectly clean, and the ground occasionally stirred about them.

The proper seasons for removing them are either the early autumn or spring; the former in dry grounds, and the latter in those that are of a retentive nature.

In the second sort the seeds, after being prepared as above, should be sown in pots, and plunged the second spring in a gentle hot-bed, in order to bring up the plants. They should then be kept in the pots, and have protection in the winter season till they have become of hardy growth, when they may be turned out, and planted in warm situations. They afterwards require protection in very severe winters.

The third sort may be managed in the same way as the second, the young plants being gradually inured to the open air, having only the morning sun at first. They should be kept in the pots four or five years, as they grow slowly, being well protected in the winter. They all succeed best in a dry soil.

All the varieties of the different sorts are to be continued either by budding or grafting upon stocks of the first sort. The first should be performed in the latter part of the summer, and the latter in the early spring, upon stocks of two years' growth. See BUDDING and GRAFTING.

All the sorts and varieties are highly ornamental in the clumps, borders, and other parts of pleasure-grounds, affording much variety when judiciously intermixed. The first sort frequently rises to a large tree, having a fine white hard wood, useful for various purposes. The bark also affords the substance called *bird-lime*, which is prepared by boiling it till the green part is capable of being separated from the white, then laying it in a cool cellar for a few days, afterwards pounding it till it becomes a tough paste, washing it repeatedly, till it becomes quite clear, then placing it in an earthen vessel to ferment or become fine, when it will be fit for use.

ILLECEBRUM, a genus containing plants of the herbaceous, flowery, biennial, and shrubby perennial kinds.

VOL. II.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that the calyx is a five-leaved cartilaginous perianthium, five-cornered, with coloured leaflets, which are sharp, with distant points, permanent: there is no corolla: the stamina have five capillary filaments, within the calyx: anthers simple: the pistillum is an ovate germ, sharp, ending in a short bifid style: stigma simple, obtuse: the pericarpium is a roundish acuminate capsule, both ways five-valved, one-celled, covered by the calyx: the seed single, roundish, sharp on both sides, very large.

The species cultivated are: 1. *I. lanatum*, Woolly Illecebrum; 2. *I. suffruticosum*, Shrubby Illecebrum, or Knot-grass; 3. *I. Paronychia*, Mountain Illecebrum, or Knot-grass.

The first has a rigid round stem, somewhat hairy, branched only at the base: the leaves are lanceolate, ovate, subsessile, opposite, petioled, quite entire, sharpish, naked, pubescent underneath: (spikes close, oblong, and axillary:) the peduncles lateral, very short, in three or four sessile spikes, unequal to the leaflet: stamens connected at the base by means of a five-toothed crown: the seed kidney-form. It is a native of the East Indies, biennial, and flowering most part of the year.

It varies in size. This is the smaller one. The Great Woolly Illecebrum has solitary, not aggregate spikes. And, according to Retzius, there is a remarkable variety with round leaves, in Malabar.

The second species has woody stems about a foot high, with small leaves like those of Knot-grass: the flowers come out singly on the side of the stems, and make no great appearance. It is a native of the south of Europe, flowering from May to August.

The third has trailing stalks near two feet long, with leaves like those of the second kind; the heads of flowers come out from the joints of the stalk, having neat silvery bractes surrounding them, which make a pretty appearance: the flowers appear in June, and there is generally a succession of them for at least two months. It is perennial, and a native of the south of Europe.

Culture.—The first sort may be increased by sowing the seeds in pots of light mould, in the spring, in the same manner as the amaranthus, plunging them in a mild hot-bed. And if they be afterwards plunged in the tan-bed in the stove, these branches will often put out roots by which they may be raised.

Cuttings of the branches managed in the same way will sometimes grow.

C

The two last sorts may be propagated by seeds and cuttings.

The former should be sown in the spring, as about April, in pots, or on a bed of light earth. When the plants have attained some growth, they should be taken up carefully with earth about their roots, and placed, some in pots, and the others in a dry warm border, due water and shade being given; those in pots being protected by a frame and glasses in the winter, and those in the open ground screened in severe frosts, by mats or other means, and kept perfectly clean.

They may also be increased by planting cuttings of the branches, in the summer months, as about June, in pots or a shady border. When they have taken good root, they may be removed to the places where they are to grow, or into other pots, moist weather being chosen for the purpose.

The first sort affords variety in the stove or green-house collections; and the latter in the borders, and among potted plants of the more hardy kinds.

IMMORTAL FLOWER. See **GNAPHALIUM.**

IMPATIENS, a genus containing plants of the flowery annual kind.

It belongs to the class and order *Syngenesia Monogamia*, and ranks in the natural order of *Corydales*.

The characters are: that the calyx is a two-leaved perianthium, very small: leaflets roundish-acuminate, equal, placed towards the sides of the flower, coloured, deciduous: the corolla is five-petalled, ringent: petals unequal; of which the superior is roundish, flat, upright, slightly trifid, constituting the upper lip: lower pair reflex, very large, outwardly larger, obtuse, irregular, constituting the lower lip: intermediate pair opposite, rising from the base of the upper petal: nectary one-leaved, receiving in the manner of a hood the base of the flower, oblique at the mouth, rising outwardly, ending in a horn at the base: the stamina have five filaments, very short, narrower towards the base, incurved: anthers as many, connate, divided at the base: the pistillum is a superior germ, ovate-acuminate: style none: stigma simple, shorter than the anthers: the pericarpium is a one-celled capsule, five-valved, springing open elastically, the valves rolling spirally: the seeds several, roundish, fixed to a columnar receptacle.

The species cultivated are: 1. *I. Balsamina*, Garden Balsam; 2. *I. Noli me tangere*, Common Yellow Balsam.

The first is an annual plant, rising a foot and half high, and dividing into many succulent branches: the leaves long and serrate: the flowers come out from the joints of the stem,

upon slender peduncles about an inch long, each sustaining a single flower; but there are two, three, or four of these peduncles arising from the same joint: the flowers red or white. It is much increased in size by cultivation; and is a native of the East Indies, &c.

There are varieties with single and double red flowers, with single and double scarlet flowers, with single and double white flowers, with single and double purple flowers, with variegated single and double flowers, with large double variegated scarlet and white flowers, with large double variegated purple and white flowers, with double red and purple flowers, and with large double bizarre flowers.

The second species has an annual root: the stem a foot high, upright: stem and branches pale yellowish green, smooth and shining, somewhat transparent, thickest at the joints, succulent and brittle: the branches sometimes opposite: the lower leaves ovate, uppermost elliptical or lanceolate, irregularly serrate, all smooth, petioled: the upper part of the stem flexuose, forming an obtuse angle opposite to each leaf: some of the branchings of the peduncles have bractes, and some not: the flowers yellow; the lateral petals spotted with red, by cultivation changing to pale yellow or purplish; these are blunt, slightly two-lobed, with an oval appendix at the base, about an inch in length, and above half an inch in breadth. It is a native of Europe.

When the seeds are ripe, upon touching the capsule they are thrown out with force; hence the name.

Culture.—These beautiful plants are all capable of being increased by sowing the well-ripened seeds of the best varieties annually, in the spring, in the first sort, in pots filled with light, dry, good earth, or in the mould of the bed, plunging them in the former case in the hot-bed; or in the natural ground, in the borders, in a warm dry situation, covering them with glasses; but the two former are the best methods. When the plants are up, they must have air admitted freely every day when fine, and occasional moderate waterings. After they have attained a few inches in growth, they should be carefully removed into separate pots, with balls of earth to their roots, being replunged in the hot-bed, or be pricked out on a fresh hot-bed. Those in the natural ground should be kept properly thinned, and be removed into pots, or the situations where they are to flower, about the end of June, with balls of earth, as in the others.

It is a practice with some to remove those in pots and on hot-beds a second time in about a

month; but they grow stronger where this is avoided, by placing them at first in larger pots, and thinner in the bed, so as to have full room to rise to a proper size. The frames should be raised as the plants advance in growth.

About the beginning of June they should be gradually exposed to the influence of the full air, in order to harden them, that they may be set out towards the end of it; when they should have sticks placed for their support, to which they should be neatly tied. The potted plants should likewise be often refreshed with water, once or more in the day, when the season is hot. Those in the open ground should also be occasionally watered in dry weather. See **ANNUAL PLANTS**.

All these plants may be raised with great facility in the stove, in the same manner as above.

In the second species the seed may be sown either early in the spring, or in the autumn. In both the species those in the natural ground should be sown later than in the hot-bed method.

In order to save seed, a few of the best plants, of the different finest varieties, should be placed, when in full blow, in some airy situation, so as to be exposed to the sun, and at the same time protected from wet by glasses.

The fine potted species and varieties of these plants are highly ornamental among other potted plants, in the most conspicuous places about the houses; and the less valuable kinds in the fronts of the borders, clumps, and other parts of pleasure-grounds, in mixture with other flowery plants.

INARCH-GRAFTING. See **GRAFTING**.

INARCHING, a method of grafting by which the parts of different trees are bent down and united, while the trees remain growing. See **GRAFTING**.

INDIAN ARROW-ROOT. See **MARANTHA**.

INDIAN CORN. See **ZEA**.

INDIAN CRESS. See **TROPÆOLUM**.

INDIAN FIG. See **CACTUS**.

INDIAN GOD TREE. See **FICUS**.

INDIAN MALLOW. See **SIDA**.

INDIAN OAK. See **TECTONA**.

INDIAN REED. See **CANNA**.

INDIAN SHOT. See **CANNA**.

INDIGO. See **INDIGOFERA**.

INDIGO, BASTARD. See **AMORPHA**.

INDIGOFERA, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-

leafed perianthium, spreading, nearly flat, five-toothed: the corolla papilionaceous: standard rounded, reflex, emarginate, spreading: wings oblong, obtuse, spreading at the interior margin, of the shape of the standard: keel obtuse, spreading, deflex, marked on each side by an awl-shaped hollow dagger or point: the stamina have diadelphous filaments, disposed in a cylinder, ascending at their tips: anthers roundish: the pistillum is a cylindric germ: style short, ascending: stigma obtuse: the pericarpium is a roundish long legume (linear-oblong, commonly four-cornered): the seeds some, kidney-shaped (kidney-retuse or cuboid).

The species cultivated are: 1. *I. tinctoria*, Dyer's Indigo; 2. *I. argentea*, Silvery-leaved Indigo; 3. *I. candicans*, White Indigo; 4. *I. amara*, Scarlet-flowered Indigo.

The first has the stem filiform, subflexuose, angular, smooth, upright, a foot and half high, a little branched at top: the branches like the stem, alternate, upright: the leaflets in four pairs or more, very blunt with a point, smooth, very finely villose underneath, almost equal: the racemes from the axils of the leaves, when they begin to flower, much shorter than the leaf, but becoming longer as they advance: the legumes drooping, subcolumnar, sharp, straight, very finely villose. It is a native of the East Indies.

The second species has the whole plant silky and glaucous: the stem suffruticose, upright, branched, round, from half a yard to three quarters of a yard in height, and gray: branches alternate, stiff, round, finely silky, and hoary: the leaves alternate, petioled, two-paired (seldom ternate), spreading, three inches long: leaflets opposite, subsessile (the end one larger and petioled), quite entire, bluntish, the older ones subemarginate, the midrib raised only underneath, finely silky, glaucous, spreading, flat, from twelve to fifteen lines in length, and from six to eight lines in breadth: the petioles round on one side, grooved on the other: the racemes axillary, solitary, upright, shorter than the leaves, an inch and half long: the flowers on short, alternate, reflex pedicels, and drooping. It is a native of Egypt or the West Indies.

The third is distinguished by the whiteness of the stem and the under-side of the leaves: the flowers are red, not many (five to eight or nine) in a spike. It is a native of the Cape, flowering from July to September: but its principal time of flowering, according to Mr. Curtis, is from the beginning of May to the middle of June.

The fourth is a native of the Cape, flowering in March and April.

Culture.—The first sort of these plants may

be increased by seeds, which should be sown in the spring, in pots of light fresh earth, and plunged into a mild hot-bed. When the plants have attained some growth, they should be removed into separate pots, and be replunged in the bark-bed of the stove, where they must be constantly kept.

The other sorts may be propagated by planting cuttings of the young shoots, in pots of good fresh earth, in the spring or summer, plunging them in the bark hot-bed of the stove. When they have stricken good root, they should be removed into separate pots of the same sort of mould, preserving some earth about their roots, replunging them in the hot-bed, due shade and water being given. They may afterwards be preserved in a dry stove or good green-house.

Such of the sorts as ripen seeds here may also be increased in that way.

The first is the plant from which Indigo, a material much employed in dyeing, is prepared.

This and the second kind also afford variety in stove collections; and the two others among plants of the green-house kinds.

INOCULATING, the practice of inserting the buds of trees of the same kind into their stocks.

The most proper season for this sort of work is, from the middle of June until the middle of August, according to the forwardness of the season, and the particular sorts of trees to be increased; but it may be easily known, by trying whether the buds will come off well from the wood or not. The most general rule is, when the buds are found to be formed at the extremity of the same year's shoots, which is a sign of their having finished their vernal growth. The first sort commonly inoculated is the Apricot, and the last that of the Orange-tree, which should never be done until the middle of August. In doing this sort of work, choice should be made of cloudy weather; as, when done in the middle of the day, in very hot weather, the shoots perspire so fast as to leave the buds destitute of moisture; nor should the cuttings be taken off from the trees long before they are used; but if fetched from some distance, the leaves should be cut off, but all the foot-stalks left, and then wrapped up in wet moss, and put in a tin box, to exclude the external air.

And the practice of throwing cuttings into water is improper; as it saturates the buds so with moisture, that they have no attractive force left to imbibe the sap of the stock; for want of which they very often miscarry, and disappoint the operator.

It is remarked by Mr. Forsyth, that when the Pear-trees which are grafted in the spring

have not taken, he would advise the cutting them off, a little below the graft, at a joint or bud. The tree then throws out a great number of healthy shoots; all of which should be rubbed off, except so many as are sufficient to fill the wall; nailing those up, to prevent the wind from breaking them. About the latter end of July the shoots will be fit to inoculate, which should then be done, leaving a little of the wood on the inside of the bud when inserted into the stock, and rubbing in some of the composition, tying on the bass.

Having grafted some summer Bonchrétiens with the Bergamot de Pasque (or Easter Bergamot) and Pear d'Auch, in the spring, most of which failed, he cut them off below the grafts, and in July following they had produced shoots from five to six feet long, which he inoculated in the latter end of that month with the before-mentioned sorts, which all took. About the beginning of September he ordered the basses to be slackened; which being left too loose, the barks began to separate. He then made them be tightened, letting them remain till the following spring. About the beginning of April, when he saw the buds begin to shoot, he cut the shoots near to the buds; but finding many where the bark had not united, and some of the eyes apparently dead, he took a sharp pen-knife, and cut out all the decayed bark, rubbing in some of the composition, in the liquid state, till the hollow parts were filled up; he then smoothed it off with the finger, even with the bark of the stock. He also rubbed some of the composition over those eyes that were in the worst state, being quite black; but with very little hope of recovery. "To his great astonishment, many of those which seemed perfectly dead, recovered, and by the middle of July had shoots from five to six feet long (many of the shoots which took well having fruit-buds formed for next year), and covered a space of wall larger than a young tree would have done in eight years; all the cavities where he cut out the dead bark and applied the composition, were, in the course of the summer, filled up with sound wood, and the bark between the stocks and grafts perfectly united."

"Three years ago he inoculated some Brown Beurrés and Crasanes with Pear d'Auch, one of which now covers a wall sixteen feet high, and fifteen feet long, and has more fruit on it this year than a maiden tree would have produced twenty years after planting." But he "never recommends inoculating or grafting of old trees, except when bad sorts, or more of any sort is wanted for a supply: in that case, he would recommend to inoculate or graft with Pear

d'Auch, Colmars, and Winter Bonchrétiens, which keep much longer than Beurrés, Crasancs, &c."

For standards that have been grafted in the spring, and have missed, he advises that they should be cut below the graft, as, when so treated, they throw out a great number of shoots, which should by no means be too soon thinned, as in that case they will be liable to be broken by the wind. The weakest shoots may be begun to be taken off about the latter end of May or beginning of June. About the middle of the latter month, they will have acquired considerable strength: then thin them; leaving as many strong regular shoots, and of those nearest the top of the stem, as will form a handsome head. If the stem be very strong it will be necessary, perhaps, to leave more than are intended to be inoculated, on purpose to receive the sap, which will flow in great abundance from a large trunk, and, without this precaution, be apt to burst the shoots. He has often seen shoots as large as his arm burst by a superabundance of sap. When that is likely to happen, the best thing is, to scarify the shoots, and rub a little of the composition into the wounds.

INSECT DISEASES, such vegetable diseases as are produced by different sorts of animals of the insect tribe. See **VEGETABLE INSECT DISEASES**.

The chief insects that affect plants of the fruit-tree kinds, are those of *Aphis*, *Acarus*, *Ant*, *Chermes*, *Cicada*, *Coccus*, *Earwig*, *Papiño*, *Phalæna*, and *Thrips* tribes.

Of the first sort there are a vast number of species, each tree being said to be infested by a different distinct species. Hence the author of the *Systema Vegetabilium* has denominated them from the trees on which they are found; as, the Cherry *Aphis*, Currant *Aphis*, Plum *Aphis*, &c. The males are few in comparison with the females, and have wings, while the latter are numerous, and without them. See **PUCERON** and **VINE-FRETTER**.

The second is a highly destructive insect in houses where forcing is practised. It is not furnished with wings, but the female is oviparous. The species, as in the former, are very numerous. It often commits great mischief on vines, peaches, nectarines, cherries, forced kidney-beans, melons, &c. See **RED SPIDER**.

The third, or *Ant*, is highly injurious to fruits, especially those of the peach kind, as they become in a state of maturity. They run all over the trees, and the best fruit is occasionally filled with them. It has been supposed by some that they are of use by devouring the Aphides on the trees; but Mr. Forsyth is of a different opi-

nion, and we have often seen fruit much spoiled by them.

The best methods of destroying them, according to the above author, is, by making holes in the ground along the side of the wall where the fruit-trees are, by an iron crow, so that the inside surface may be quite smooth. These insects, from being disturbed, soon come to the holes, and fall into them; when, being prevented from getting up by the smoothness of the sides, they may be readily destroyed by pouring water upon them. But more effectual methods are, either by mixing quick-lime with soot, and placing it in their tracks, or putting it in their nests, and then pouring water, or urine and soap-suds, upon it, so as to slake it, confining the heat by a turf, or some earth. The heat thus produced soon destroys them. The powder of stavesacre laid round the stems of trees, is said to prevent their running up them.

The fourth, or *Chermes*, belongs to the order *Hemiptera*.

There are several species. Their specific names are taken from the different plants on which they are principally met with; as the *Chermes graminis*, or Grass Bug; *Chermes ficus*, or Fig-tree Bug, &c. The last is one of the largest of the genus, being brown above and greenish beneath, and has four long wings, placed in the form of an acute roof. The larva is of an oblong form, and has six feet, but its motion is slow. When attempted to be caught, the *Chermes* makes its escape rather by leaping than flying, by means of its hinder legs, which play like springs. Several of the species are provided at the extremity of their bodies with small sharp-pointed implements, but which lie concealed; and these they draw out in order to deposit their eggs, by making punctures in the plants that suit them. It is in this way that the Fir-tree *Chermes* produces that enormous scaly protuberance which is sometimes found at the summit of the branches, and which is formed by the extravasation of the juices occasioned by the punctures. The young larvæ shelter themselves in cells contained in the tumour. These insects are capable of being destroyed in the same manner as the *Cocci* tribe.

The fifth, or *Cicada*, belongs to the same order as the above.

The larvæ of many of this tribe void large quantities of frothy matter upon the leaves and branches of the plants and trees, in the midst of which they are always concealed, probably for protection, and to be shaded from the sun's influence. These insects should be destroyed, as the froth is unpleasant, and the leaves of the trees are often devoured, by rubbing off the

larvæ with the hand, and afterwards watering the trees well with soft water, such as that of ponds.

The sixth, or *Coccus*, also belongs to the same order, and the males have wings, but the females none.

The sorts most commonly met with, when full grown, have somewhat the form of a boat, with the keel uppermost, being apparently without feet, eyes, &c. while in this state resembling some sorts of galls or excrescences of the bark of trees.

Mr. Forsyth observes, that "a thin film of a white cotton-like substance is interposed between the flat part of the body and the tree. This is common, in a greater or lesser quantity, to all the species, and appears at first all round the edge as a kind of cement, to join it to the tree. The males are very few in proportion to the females, and not nearly one-fourth of their size; they are beautiful little flies, which, after a short but active life, terminate their existence without having tasted food, being provided with no sort of organs for that purpose."

"The Peach, Nectarine, and Pear Trees are very much infested with these insects: they frequently cut through the bark, and the trees then appear as if they had been scratched by cats." He has "seen some with this appearance all over them."

He advises, that "when these insects first appear on the bark, they should be scraped off with a wooden knife, and the stem and branches of the tree well washed with soap-suds and urine, applied with a stiff painter's brush. This should be done in February, before the buds begin to come out. But if the outer bark is perforated, it must be cut or pared off with a long knife; and if you find any brown spots in the inner bark, they must be carefully cut out. This disease is, he thinks, one great cause of the canker, and of the death of the tree."

And it is added, that "when this disease has made its way through both barks, as is often the case, the branches on each side of the tree may be cut close to the stem, if it has an upright one; but if the tree be trained fan-fashion, the best way is to head it near to the place where it was grafted."

He has "headed old Pear-trees which were so dead, except a small strip of live bark on one side, that you might rub the bark off them as easily as off a bundle of faggot-sticks that had been cut upwards of a year; yet these trees have shot out fresh branches to the length of seventeen feet in two years, and produced fine fruit the second year." It is advised to apply the composition immediately after heading, or cutting, or paring off the diseased bark.

It is further remarked, that "a very destructive species of the *Coccus* tribe has lately done incredible damage to the Apple-trees in the nurseries and gardens in the neighbourhood of London. Some nurserymen have lost several thousand Apple-trees in one year. These insects attach themselves to the bark by their suckers, and, by feeding on the juices of the tree, rob it of its nourishment. Such trees as are infested with them have a sickly appearance. These insects generally make their nests where branches have been cut off, or in hollow places, where the canker has eaten holes in the trees. Their first appearance is like a white down; on touching or rubbing them, they tinge the fingers of a crimson colour, like cochineal. If suffered to remain long on trees, they take wing, like Aphides."

The method that he has followed for these ten years to destroy them, is, to "rub the places where their nests are with an old brush, such as painters use, till they are all cleaned off; and if the part be canker-eaten, to cut it clean out with a knife or chisel: he then takes of soap-suds and urine equal parts, and with this he washes the wound and the bark all round it; and with a brush applies the composition, mixed with wood-ashes and the powder of burnt bones, covering the wound all over with it. Afterwards he shakes some of the powder of wood-ashes and burnt bones, mixed with an eighth part of unslaked lime finely powdered and sifted, over the hollows, or where knobs have been cut off."

And he advises, that "at the same time that the trees are cleared of the cocci the caterpillars should be picked off."

He adds, that "the first time that he observed the new *coccus* which has done so much mischief to the Apple-trees about London, was in a garden of his own at Chelsea, about the year 1782 or 3; and, as far as he can learn, they were imported, among some Apple-trees, by the late Mr. Swinton, of Sloane-street. Mr. Swinton afterwards removed his nursery to the King's Road, near Chelsea College, which now goes by the name of the Foreign Nursery."

Train oil has been tried, laid on with a painter's brush, but without effect.

The seventh, or *Earwig*, is often very destructive to fruit, particularly that of the Peach kind. The method recommended by Mr. Forsyth for destroying them, and which he has long pursued with success, is, to "take old bean-stalks, and cut them about nine inches long, tying them up in small bundles with some pack-thread, or with small yellow willows, and hanging them on nails against the wall, at different parts of the trees. The first thing in the morning, be-

ing provided with a board about eighteen inches square, and a small wooden trowel, take down the bundles of bean-stalks, one by one, strike them against the board, and with your trowel kill the Earwigs as they fall out of the stalks. If you follow this up every morning (or every other morning) you will be able to keep them under."

This method answers for any sort of trees infested with Earwigs. In some years he has "seen a great part of the fruit, especially the smooth-skinned sorts, destroyed by these insects, and a small green caterpillar; and in a scarce year of fruit, the leaves of peaches are frequently destroyed by them." It is advised, that "the shreds taken from trees that have been unnailed in autumn, should be soaked in boiling hot soap-suds for three or four days, previous to their being used again; as this will kill the eggs of Earwigs and other insects that may be deposited on them."

The eighth, *Papilio*, or Butterfly, belongs to the order *Lepidoptera*.

There are a great many species of this genus, mostly distinguished by the colour of their wings. The more common sorts, with their caterpillars, are well known.

Mr. Forsyth advises, that the caterpillars and chrysalids should be carefully picked off, and the trees be well watered with clear lime-water and tobacco-water mixed.

The ninth, *Phalæna*, or Moth kind, are extremely numerous, their caterpillars differing much in size, shape and colour. After casting their slough several times, all of them spin their cod, in which they are transformed to chrysalids. In this state they are often found rolled up in the leaves of fruit-trees, especially those of the pear, plum, and cherry kind. See *PHALÆNA*.

Of the *Sphinx*, or Hawk Moth kind, there are a vast number of species. Their caterpillars apply the hinder part of their bodies to the branches of trees, holding the rest erect; hence the name. In general they spin their cod under ground.

They appear early in the morning, or after sun-set, flying heavily, and making a sort of noise. Several of the caterpillars are green, and some brown, yellow, spotted, or belted. See *PHALÆNA*.

The *Phalæna nustria*, or Lackey Moth, deposits its eggs in rings or circles round the branches of fruit-trees, having the appearance of a necklace. See *PHALÆNA*.

The tenth, or *Thrips*, belongs to the order *Hemiptera*; and there are several species. It is extremely small, so as scarcely to be discovered. It produces much mischief on fruit-trees, devouring the fruit as well as the leaves.

It may be destroyed in the same manner as the Coccis.

The pernicious effects of these different insects, as well as the means of removing them, will be more fully explained in speaking of those vegetable diseases that are caused by the attacks of insects. See *VEGETABLE INSECT DISEASES*.

INULA, a genus comprehending plants of the herbaceous and shrubby kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common imbricated: leaflets lax, spreading: the exterior ones larger, of equal length: the corolla compound, radiated, broad: corollules hermaphrodite, equal, very numerous in the disk: females strap-shaped, numerous, crowded, in the ray: proper of the hermaphrodite, funnel-form: border five-cleft, rather upright: female strap-shaped, linear, perfectly entire: the stamens in the hermaphrodite have five filaments, filiform, short: anther cylindric, composed of five smaller linear conjoined ones; each ending below in two straight bristles of the length of the filaments: the pistillum in the hermaphrodite is an oblong germ: style filiform, length of the stamens: stigma bifid, rather upright: in the females, germ long: style filiform, half bifid: stigmas erect: there is no pericarpium: the calyx unchanged: the seeds in the hermaphrodites solitary, linear, four-cornered: pappus capillary, length of the seeds: in the females like the hermaphrodites: the receptacle naked, flat.

The species cultivated are: 1. *I. Helenium*, Common Inula, or Elecampane; 2. *I. Britannica*, Creeping-rooted Inula; 3. *I. salicina*, Willow-leaved Inula; 4. *I. Canariensis*, Canary Inula; 5. *I. satureioides*, Savory-leaved Inula; 6. *I. fruticosa*, Shrubby Inula.

The first has a perennial, thick, fusiform, brown, branching, aromatic root; according to some, biennial: it is one of the largest herbaceous plants, being from three to five or six feet high, with the stem striated and downy, branched towards the top: the lower leaves on foot-stalks, lanceolate, a foot long, and four inches broad in the middle; upper embracing, ovate-lanceolate, wrinkled, serrated or toothed, deep green, and slightly hairy above, whitish green and thickly downy beneath: the flowering heads very large, single, terminating the stem and branches. It is a native of Japan, &c. flowering in June and July.

The second species has a perennial root: the stem near two feet high, dividing in the upper part into two or three upright branches or pe-

duncles, each sustaining one pretty large flower, of a deep yellow colour. These are in beauty in July, but seldom ripen seeds in this climate. It is a native of Germany, &c.

The third has a perennial root, aromatic, sub-astringent, smelling like cinnamon: the stem from a foot to two, and even three feet in height, upright, smooth, hard, firm, tinged with red, grooved or angular towards the top, where it is usually branched: the leaves alternate, sessile, or half embracing, stiff, smooth, of a dark shining green, very slightly cut, and somewhat rugged about the edge: the flowers terminating, on alternate, one-flowered, grooved, reddish peduncles, forming altogether a corymb: the calycine scales in two rows, smooth, brown, lanceolate, curved back a little at the end: the flower an inch in diameter. It is a native of Germany, &c.

The fourth rises with several shrubby stalks near four feet high, which divide into smaller branches: the leaves in clusters, narrow, fleshy, divided into three segments at their points: the flowers come out on the side of the branches at the top of the stalks; they are small, and of a pale yellow colour, appearing in August. It is a native of the Canary islands.

The fifth rises with a shrubby stalk about two feet high, dividing into many smaller branches, which are hairy: the leaves narrow, stiff, sessile; from the edges of these arise long hairs, which are stiff, and come out by pairs; at the end of the branches arise naked peduncles, four or five inches long, sustaining one small, yellow, radiated flower. It is a native of Vera Cruz.

The sixth has a stem ten or twelve feet high, divided into several woody branches: the leaves five inches long, and one inch and a half broad in the middle, smooth on the upper side, but on their under having three longitudinal veins: the flowers are produced at the end of the branches, having very large scaly calyxes; they are as large as a small Sun-flower, of a pale yellow colour. It is a native of Carthage in New Spain.

Other species may be cultivated.

Culture.—The first sort may be propagated by seeds sown in autumn soon after they are ripe, on a warm, loamy, rather moist border. The plants should be transplanted to the places where they are to grow in the following autumn.

But the common practice is to increase it by offsets, which, when taken from the old roots carefully, with a bud or eye to each, take root easily: the best season is the autumn, as soon as the leaves begin to decay; planting them in rows about a foot asunder, and nine or ten inches distance in the rows. The following

spring the ground should be kept clean from weeds, and be slightly dug over in the autumn following. The roots will be fit for use after two years growth, but will abide many years if permitted to stand.

The two following sorts may be increased by parting the roots, and planting them in the autumn, in the borders or other places where they are to remain. They should not be removed oftener than every three years.

The fourth and fifth sorts may be raised by planting cuttings of the branches, in the summer season, in pots of light earth, in shady borders. They must be removed into shelter in autumn, but should have as much free air as possible at all times, when the weather is mild. In cold weather the first should have but very little water, as, the stalks and leaves being succulent, they are very apt to rot. In summer they should be placed abroad with other hardy exotic plants, in a sheltered situation.

The last sort is propagated by seeds procured from where it grows naturally. These must be sown in pots, or upon a hot-bed, and when the plants are fit to remove, be each put into a small pot filled with light earth, and plunged into a fresh hot-bed; treating them in the same manner as other similar tender plants. It requires to be kept constantly in the stove.

The first sort may be cultivated for the medicinal use of the roots, or for ornament, in large borders.

The two following sorts may have places in the same way.

The fourth and fifth kinds afford variety among other potted green-house plants, and the last among stove plants.

IPOMŒA, a genus containing plants of the herbaceous flowery kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a five-toothed perianthium, oblong, very small, permanent: the corolla one-petalled, funnel-form: tube subcylindric, very long: border five-cleft, spreading: divisions oblong, flat: the stamina have five awl-shaped filaments, almost the length of the corolla: anthers roundish: the pistillum is a roundish germ: style filiform, length of the corolla: stigma headed-globose: the pericarpium is a roundish capsule, three-celled: the seeds some, sub-obovate.

The species cultivated are: 1. *I. Quamoclit*, Winged-leaved Ipomœa; 2. *I. coccinea*, Scarlet-flowered Ipomœa.

The first is an annual plant, rising with two oblong pretty broad seed-leaves, which remain



Painted by Wm. Edwards

London. Published Aug. 1. 1866. by G. Kearley, Fleet Street

Engraved by F. Sargent

1 *Iris germanica*
German Iris

2 *Iris versicolor*
Various coloured Iris

3 *Iris variegata*
Variegated Iris

a considerable time before they fall off: the stems slender, twining, and rising by support to the height of seven or eight feet; sending out several side-branches, which twine about each other and the principal stem, and about any neighbouring plants: the leaves are composed of several pairs of very fine narrow lobes, not thicker than fine sewing thread, about an inch long, of a deep green, either opposite or alternate: the flowers come out singly from the side of the stalks, on slender peduncles about an inch long: the tube of the corolla is about the same length, narrow at bottom, but gradually widening to the top; where it spreads open flat, with five angles; it is of a most beautiful scarlet colour, and makes a fine appearance. It is a native of the Indies.

The second species has a herbaceous stem, twining, quadrangular, flexuose: the leaves petioled pentangular, smooth on both sides: the peduncles very long, axillary, upright, round, two-parted-bifid, on one-flowered pedicels: the flowers long, scarlet, larger than those of the first sort: calyx five-cleft, with lanceolate segments: tube of the corolla narrower at the base, long, columnar, curved a little, and shining: border plaited, blunt: base nectareous. It is an annual plant, six or eight feet high, and a native of the West Indies.

There is a variety with orange-coloured flowers,

Culture.—These plants are increased by sowing the well ripened seed in small pots, plunging them in a mild hot-bed, or in the earth of the bed, in the early spring months, proper air and water being given. When the plants have attained some growth, and in the first sort begin to climb, they should be removed with balls of earth about their roots into the places where they are to grow, or, which is better for the first kind, into separate large pots, replunging them in the bark hot-bed. They should have proper sticks set for them to twine about, some pots of the first kind being placed in the stove, as being more tender.

The first sort affords variety in the stove, and among other tender potted plants in the summer; and the latter in the fronts of warm borders, as well as among the less tender potted flowering plants.

IRIS, a genus containing plants of the fibrous, tuberous, and bulbous-rooted flowery herbaceous perennial kinds.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatae*.

The characters are: that the calyx has bivalve spathes, separating the flowers, permanent: the corolla six-parted: petals oblong, obtuse; the

VOL. II.

three exterior ones reflex, the three interior upright and sharper; all connected at the claws into a tube, of different lengths in the different species: the stamens have three awl-shaped filaments, incumbent on the reflex petals: anthers oblong, straight, depressed: the pistillum is an inferior oblong germ: style simple, very short: stigmas three, petal-form, oblong, carinated within, furrowed without, incumbent on the stamens, two-lipped: outer lip smaller, emarginate: inner larger, bifid, subinflected: the pericarpium is an oblong, cornered capsule, three-celled, three-valved: the seeds several and large.

The species cultivated are: 1. *I. pumila*, Dwarf Iris; 2. *I. susiana*, Chalcedonian Iris; 3. *I. Florentia*, Florentine Iris; 4. *I. biflora*, Twice-flowering Iris; 5. *I. aphylla*, Leafless Iris; 6. *I. variegata*, Variegated Iris; 7. *I. Germanica*, German Iris; 8. *I. sambucina*, Elder-scented Iris; 9. *I. squalens*, Brown-flowered Iris; 10. *I. cristata*, Crested Iris; 11. *I. tricuspidis*, Trifid-petalled Iris; 12. *I. Xiphium*, Bulbous-rooted Iris; 13. *I. Pseudacorus*, Common Yellow or Water Iris; 14. *I. foetidissima*, Stinking Iris; 15. *I. Virginica*, Virginian Iris; 16. *I. versicolor*, Various-coloured Iris; 17. *I. ochroleuca*, Pale-yellow Iris; 18. *I. verna*, Spring Iris; 19. *I. Persica*, Persian Iris; 20. *I. graminea*, Grass-leaved Iris; 21. *I. spuria*, Spurious Iris; 22. *I. Sibirica*, Siberian Iris; 23. *I. Martinicensis*, Martinico Iris; 24. *I. Pavonia*, Peacock Iris; 25. *I. tuberosa*, Snake's-head Iris.

The first has the root brownish on the outside, white within, knobbed, with pale fibrils: the leaves acute, sometimes shorter, sometimes longer than the flower: the stem or scape very short, often scarcely an inch in length: germ oblong, bluntly and obscurely three-cornered, an inch long, inclosed within two spathes, ending in the tube of the corolla, which is slender, and from two to three inches in length: all the petals are almost entire, blue or purple, varying much in colour, insomuch that the same flower changes, and from blue becomes more and more red: outer beards blue, inner white, with yellow tips. It is a native of Austria, flowering in April.

There are varieties with white flowers, with straw-coloured flowers, with pale blue flowers, with blush-coloured flowers, with yellow variable flowers, with blue variable flowers.

The second species has the scape simple, round, grooved, a span high: the leaves alternate, sheathing, upright, very finely striated, obscurely waved: the corolla the largest of all the species, very thin: the claws of the larger petals purple on the outside, dotted and streaked

D

with purple within; border suborbiculate, waved, bent in at top, upright; border of the smaller petals ovate, bent down, with the edge frequently bent back, blunt, of the same colour with the larger ones, but shorter and narrower; the claws bearded within from the flexure to the base with brownish-yellow cilia. It flowers at the end of May or beginning of June, and is a native of the Levant.

The third has the scape round, striated, simple, upright, a foot high and more, bearing two or three flowers: the leaves nerved, subfalcated, obscurely curved on the outer edge: the lower petals connate at the base: the claws of the larger ones thickish, with a thin winged edge, an inch long, green on the outside, bearded within, with white cilia, yellow at the top: border blunt, emarginate, an inch wide, a little more in length, hanging down, white, striated near the flexure: smaller petals oblong, from upright bent in with a reflex margin, blunt, emarginate, white: claws thickish, attenuated, greenish. It is a native of the South of Europe, flowering in May and June.

The fourth species has the scape simple, striated, longer than the leaves, a span in height, sustaining two or three flowers, sometimes four: the leaves subfalcated, acute, striated, from erect patulous: the petals violet-coloured, entire: capsule cylindric, with three streaks. It is a native of Portugal, flowering in April and May, and again in autumn, whence the name.

The fifth has three or four large bright purple flowers, which stand above each other, and have purplish sheaths: the three bending petals or falls are striped with white from the base to the end of the beard: the capsules are large, blunt, and triangular. It flowers at the end of May. Its native place is unknown.

The sixth species has the scape striated, scarcely longer than the leaves, a foot and more in height: leaves acute, striated, upright; the lower ones the length of the scape, but the upper ones gradually shorter: the flowers at the top of the scape divided, alternate, coming out successively, handsome, yellow, netted with black: the upper part of the stem is naked, and divides into three branches, each of which has two or three flowers one above another: the three upright petals or standards are yellow, and the bending petals or falls are variegated with purple stripes. It flowers in June, and is a native of Hungary.

The seventh has the scape divided at top, larger than the leaves: the leaves reflex-falcated, nerved, an inch wide: the flowers blue, with the smaller petals quite entire, having an agreeable scent: the stalks rise near four feet high, and

divide into several branches, each supporting three or four flowers, which are covered with a thin sheath; the three bending petals or falls are of a faint purple inclining to blue, with purple veins running lengthwise: the beard is yellow, and three erect petals or standards are of a bright blue, with some faint purple stripes. It is a native of Germany, flowering in May and June.

The eighth species has the scape divided at top, longer than the leaves, two (or three) feet high: the leaves inflex-falcated at top, striated, the upper ones gradually shorter. It resembles the seventh, from which it differs in having the larger petals of a deeper violet colour, and sub-emarginate; the smaller petals emarginate, and of a deeper blue colour: the stigmas acute and serrate, with a blueish keel. It derives the trivial name from the smell of the flowers, which is very like that of Elder in bloom. It flowers at the end of May, and in June, and is a native of the South of Europe.

In the ninth, the roots are very thick, fleshy, and divided into joints, spreading just under the surface of the ground: they are of a brownish colour on their outside, but white within: the leaves rise in clusters, embracing each other at their base, but spread asunder upwards in form of wings: they are a foot and a half long, and two inches broad, having sharp edges, ending in points like swords: the stalks between these, which are a little longer than the leaves, having at each joint one leaf without a foot-stalk; these diminish in their size upwards: the stalks divide into three branches, each of which produces two or three flowers one above another at distances, each inclosed in a sheath: they have three large violet-coloured petals which turn backward, and are called falls: these have beards near an inch long on their midrib towards their base, and have a short arched petal which covers the beard, with three broad erect petals of the same colour, called standards: the stamina lie upon the reflexed petals. It flowers in June. It is a native of the South of Europe.

There are varieties with blue standards and purple falls, with pale purple standards, with white standards, and with a smaller flower.

The tenth species has a tuberous, creeping root: the stems several, short, inclining upwards, compressed, leafy: the leaves scarcely six inches long, sharpish, a little curved like a sickle at the tips, entire, with a pale membranaceous margin: the flower generally solitary, a little shorter than the leaves, erect, of a pale purplish blue: outer petals drooping, obtuse, blue, with deeper blue spots, crested in the place of the beard with three longitudinal, elevated, waved ribs, variegated with orange and yellow; inner petals narrower,

pointed, uniform in colour. It is a native of North America; flowering in May.

In the eleventh species, the bulb is the size of a hazel nut: the scape simple, round, jointed, upright, bearing one or two flowers, a foot and half in height: the leaf single, nerved, upright, with the tip hanging down, two feet long: the border of the larger petals white, suborbiculate, with a point; claws green on the outside, yellow within, dotted with black: the smaller petals several times shorter and less: claws convex on the outside, green, concave within, dotted with brown, the length of the larger ones, but narrower; segments lanceolate, divaricating, a line in length, the middle one of the three a little longer, white dotted with brown. It is a native of the Cape.

It varies in the shape of the larger petals, and much in the colours, as blue, purple, yellow, white, and spotted.

The twelfth has the leaves channelled and convoluted, not only at the base, as in the other species, but the whole length of them; they are awl-shaped at the tip, and shorter than the scape: the flowers are blue, with emarginate petals. It is a native of the South of Europe.

There are varieties with blue flowers, with violet-coloured flowers, with white flowers, with purple flowers, with yellow flowers, with blue standard petals and white falls, with blue standards and yellow falls, with striped flowers, the broad-leaved with blue flowers, the broad-leaved purple-flowered, the sweet-scented blue-flowered, the sweet-scented purple flowered, with variegated sweet-scented flowers, and the double-flowered.

The thirteenth has a fleshy root, the thickness of the thumb, spreading horizontally near the surface, blackish on the outside, reddish and spongy within, the upper part covered with numerous ridged fibres, the lower part sending down many long, whitish, wrinkled, stringy roots: the leaves from the root two or three feet long, upright, an inch or more in breadth, striated, having a prominent longitudinal midrib, equal to the scape, deep green, smooth: stem-leaves shorter, forming a sheath at the bottom: scapes from one to three feet in height, upright, alternately inclined from joint to joint, round or flattened a little, smooth and spongy: the peduncles axillary, flat on one side, and smooth; each sustaining two or three flowers, the two outer (when there are three) having one sheath, and middle flower two. It is common in most parts of Europe; flowering at the end of June, or the beginning of July.

The fourteenth species has a thick, tufted, fibrous root: the leaves grass-green, when broken emitting a strong odour, not much unlike that of

hot roast beef at the first scent. They are acute and nerved; rather shorter than the scape; which is single, cylindrical, but angular on one side, jointed, sheathed with alternate spathaceous leaves, two feet high, bearing several flowers. It is a native of France, &c.

The fifteenth has the root white within, black without, the thickness of the thumb, having white fibres, and bristly at top, with the remains of leaves: the scape compressed, upright, jointed, sheathed with alternate leaves, many-flowered, the length of the leaves, or a little higher, a foot in length: the leaves narrow, sharp, curved-in at the tip, nerved and smooth, as is the whole plant: the spathes membranaceous, acute, brownish, shorter than the peduncles, very thin at the edge and tip: the peduncles two or three inches long, round, slender, upright, one-flowered: the flowers elegant, but without scent: claws of the outer petals channelled, green on the outside, yellow on the inside, streaked with dark purple: border flat, rounded-ovate, blunt, quite entire, pale at the base, then blue with deep-blue streaks: inner petals spatulate, blunt, upright, shorter, bluer and streaked. It is a native of Virginia, flowering here in June and July.

The sixteenth species has the scape jointed, bifid at the top, or simple, many-flowered, higher than the leaves, two feet in length: the leaves alternate, sheathing; the upper ones gradually shorter: the flowers blue, large. Mr. Curtis remarks, that it has, for the most part, a stalk unusually crooked or elbowed. It is a native of North America, flowering in May and June.

The seventeenth has the scape round or roundish, covered with the sheaths of leaves, many-flowered, longer than the leaves, a foot high: the leaves falcated, acute, striated, nerved: spathes membranaceous at the edge: the larger petals dilated at the base with dusky veins; lesser snowy-white, with yellowish veins at the base: stigmas snowy-white. From its being the highest of the species of *Iris* cultivated in gardens, Mr. Curtis has named it *Tall Iris*. It is a native of the Levant, flowering in July.

The eighteenth species has tufted fibrous roots, from which arise many grass-like leaves about nine inches long; from between them come out the stalks, which are shorter than the leaves, and support one purple flower with blue standards. It flowers in May, and is a native of North America.

The nineteenth has an oval bulbous root, from which come out five or six pale-green leaves, hollowed like the keel of a boat, about six inches long, and one inch broad at the base, ending in points: between these the flower-stalk arises, which is seldom above three inches high, supporting one or two flowers, inclosed in spathes;

these have erect petals or standards, of a pale sky-blue colour, and three reflexed petals or falls, which on their outside are of the same colour, but the lip has a yellow streak running through the middle, and on each side are many dark spots, with one large deep-purple spot at the bottom: the leaves are striated and nerved, unequal, and a span in length. It is a native of Persia.

This is greatly esteemed for the beauty and extreme sweetness of its flowers, as also for its early appearance in the spring, being generally in perfection in February or the beginning of March, according to the season.

Martyn observes, that "like the Hyacinth and Narcissus, it will blow within doors in a water-glass, but stronger in a small pot of sand or sandy loam, and a few flowers will scent a whole apartment."

The twentieth species has narrow, flat, glass-like leaves, about a foot long, of a light-green colour; between these arise the stalks about six inches high, having two narrow leaves much longer than the stalks: the flowers two or three, small: the petals have a broad yellow line with purple stripes; the three falls are of a light purple colour striped with blue, and have a convex ridge running along them: the others are of a reddish purple variegated with violet; they have a scent like fresh plums. It is a native of Austria, flowering in June.

The twenty-first has a knobbed root, blackish on the outside, whitish within, with long pale fibres: the stem round, very slightly compressed, straight or a little flexuose, from two to three feet in height, taller than the leaves: the flowers commonly two, on short peduncles, each involved in its spathe; sometimes there are three; they have no scent: the colour blue-purple; but under the stigmas the reflex petals are more inclined to red: upright petals flat, and usually quite entire. According to Miller, the flowers have light blue standards, and purple variegated falls, having a broad white line in the middle instead of the beard. It is a native of Germany, &c. flowering in July.

The twenty-second species has a higher stem, the scape a foot high or more, dividing at top, three-flowered or many-flowered, longer than the leaves; which are nerved and flat: the flowers blue, in brown scariose spathes: the inner petals are upright: the germ trigonal, not grooved at the angles. It is a native of Siberia, &c. flowering in May and June.

The twenty-third has a solid sub-bulbose root, surrounded by whitish fibres, and throwing out other tubers: the stem upright, roundish, two feet high, simple: the root-leaves acuminate, quite entire, somewhat rigid, distich, flat, keeled

at the base, above simple, from upright spreading, few: the flowers few, coming out successively from the same spathe, yellow, without scent, peduncled: the petals have a black shining glandular hole or pit, like that which is common to several species of *Ranunculus*. It is a native of Martinico; flowering in November and December.

The twenty-fourth species has the scape round, jointed, villose, simple, a foot high, sustaining one or two flowers: the leaf somewhat channelled, striated, villose, the length of the scape: the spathes acute, striated, smooth, two inches long: the peduncles subancipital, one-flowered, smooth: all the petals united at the base: the three outer several times bigger than the others, ovate, obtuse, entire; the three inner much narrower and shorter by half, lanceolate, acute. This beautiful flower is orange-coloured, with black spots and dots at the base, and a heart-shaped blue spot above the base, which at bottom is tomentose and black. It is a native of the Cape.

The twenty-fifth has a tuberous root; there arise from it five or six long narrow four-cornered leaves, and from between these the stalk, supporting one small flower, of a dark purple colour. It flowers in April, but does not produce seeds in this climate. It is a native of the Levant.

Culture.—Most of the sorts may be readily increased, by parting the roots or separating the off-sets from the bulbs, and planting them out in the situations where they are to flower; the first sort in the autumn, or very early in the spring, and the latter in the close of summer, when the leaves decay, managing them in the same manner as other bulbs. As they increase and spread rapidly in their roots, they should be divided and taken off every two or three years.

New varieties of the different sorts may be raised from seed, by sowing it in the autumn in a bed of light sandy mould. The plants come up in the following spring, and in the autumn may be transplanted where they are to grow. They flower a year or two afterwards.

The bulbous-rooted sorts succeed best in such soils as are of the light, sandy, loamy kind.

The last sort answers most perfectly in such aspects as are towards the east, the roots being prevented from going too deep.

As the second sort is liable to be injured by severe winters, a few should be planted in pots to have protection. This sort is well suited for forcing.

When planted in the open ground, it requires a rather dry soil and situation.

The Cape sorts should be retained in the dry stove, and be propagated and managed in the same manner as other bulbous-rooted plants of the same kind.

All the sorts are proper for affording variety in the borders, clumps, and other parts of pleasure-grounds; and some of the more tender sorts among potted plants of similar growths.

IRON-WOOD. See *SIDEROXYLON*.

ITEA, a genus containing plants of the hardy deciduous shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rhododendra*.

The characters are: that the calyx is a one-leaved perianthium, five-cleft, upright: segments lanceolate, acute, permanent, coloured: the corolla has five petals, sessile, lanceolate, acuminate, spreading, deciduous: the stamina have five awl-shaped, upright filaments, the length of the corolla, inserted into the base of the calyx: anthers roundish, incumbent: the pistillum is an ovate superior germ: style permanent, cylindrical, the length of the stamens: stigmas two, blunt: the pericarpium is an ovate capsule, longer than the calyx, mucronated by the style, two-celled, two-valved, many-seeded: the seeds very small, oblong, and shining.

The species cultivated are: 1. *I. Virginica*, Virginian Itca; 2. *I. cyrilla*, Entire-leaved Itca.

The first is a shrub six or seven feet high, sending out many branches from the bottom to top: the leaves are alternate, slightly serrate, reflex, veined, light green. At the extremity of the same year's shoots, in the month of July, are produced fine spikes of white flowers, three or four inches long, and erect. When this shrub is in vigour, it is entirely covered with these flowers, making a fine appearance. It is a native of North America.

The second species is also a shrub, three feet in height: the stem is upright, somewhat branched, round, ash-coloured: branches alternate or scattered, spreading, angular, rufous, smooth: the leaves alternate, bluntish, revolute, with the edges a little waved, one-nerved: the midrib marked with lines above, prominent underneath, smooth, paler underneath, dry, spreading, flat, permanent, three inches long, and an inch wide: the petioles very short, cylindric below, flat above, reddish: the racemes very many, lateral at the base of the new shoots, one from each bud, on short peduncles, spreading, from four to six inches long: the flowers are scattered, pedicelled, spreading, white, two or three lines in diameter. It is a native of Carolina, flowering in July and August.

Culture.—The first is capable of being in-

creased by layers, which should be laid down in the autumn, when they will put out roots so as to be fit to take off by the following autumn, when they may be removed into the nursery, or the places where they are to grow. It does not succeed well on dry gravelly soils.

It may also be raised from seed, by sowing it in the spring, as soon as procured from abroad.

The second sort may be increased by layers or cuttings, planted in pots of good mould in the spring; in the latter case, placing them in a mild hot-bed till they have stricken root, afterwards removing them into separate pots, placing them in airy situations in the green-house.

The first is very ornamental in the borders and clumps, and the latter among green-house collections.

IVA, a genus containing plants of the hardy, deciduous, shrubby, and herbaceous annual kinds.

It belongs to the class and order *Monœcia Pentandria*, and ranks in the natural order of *Compositæ Nucamentaceæ*.

The characters are: that the calyx is common roundish: leaflets about five, subovate, blunt; almost equal, permanent, containing very many florets: the corolla compound convex: corollets male, very many in the disk; female five in the ray; proper, males one-petalled, funnel-form, five-toothed, the length of the calyx; females none: stamina males, five filaments, bristle-shaped, the length of the corollet: anthers erect, approximating: the pistillum females, oblong germ, the length of the calyx: styles two, capillary, long: stigmas acute: there is no pericarpium: calyx unchanged: the seeds solitary, naked, the length of the calyx, at top thicker, blunt: the receptacle chaffy; chaffs linear, and interior.

The species are: 1. *I. annua*, Annual Iva; 2. *I. frutescens*, Shrubby Iva, or Bastard Jesuit's-bark-Tree.

The first is an annual plant, with an herbaceous stalk, rising from two to three feet high, sending out several branches from the sides: the leaves have three deep longitudinal veins and are serrate: the stalks and branches are terminated by small clusters of pale blue flowers, which appear in July, and the seeds ripen in autumn. It is a native of South America.

The second species has slender woody branches, eight or ten feet high: the leaves serrate: the branches terminated by small clusters of pale purple flowers. It is a native of Virginia, flowering in August.

Culture.—The first sort is raised by sowing the seeds on a moderate hot-bed in the spring, and when the plants are fit to remove, placing

them in another hot-bed, treating them as the less tender annual sorts.

In the second sort, the young branches should be layed down in the spring, when they will have put out roots in about six months; or cuttings may be planted in a shady border in May, and when they have taken root, removed with earth about their roots to the places where they are to grow. It succeeds best in a dry soil and warm sheltered situation.

The first affords ornament among the less tender annuals, and the latter in the warm borders and clumps in shrubberies.

JUDASTREE. See **CERCIS**.

JUGLANS, a genus containing plants of the hardy deciduous tree kind.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male flowers the calyx is a cylindrical ament, imbricate-scattered all round, with one-flowered scales, turned outwards: perianthium elliptic, flat, six-parted: segments upright-concave, blunt: there is no corolla: the stamina have many filaments (eighteen to twenty-four, twelve to twenty-four) very short: anthers oval: female flowers heaped: the calyx is a one-leaved perianthium, bell-shaped, four-cleft, upright, very short, one-flowered: the corolla one-petalled, four-cleft, upright, acute, a little larger than the calyx: (none:) the pistillum is an oval germ, large, inferior: style very short: (styles two:) stigmas two, large, reflex, jagged at top: the pericarpium is a dry drupe, oval, large, one-celled: the seed a nut, very large, roundish, netted-grooved, half-four-celled: (corticated, two-valved: nucleus four-lobed, variously grooved.

The species cultivated are: 1. *J. regia*, Common Walnut-tree; 2. *J. alba*, White Walnut-tree, or Hickory; 3. *J. nigra*, Black Walnut-tree.

The first is a very large and lofty tree, with strong spreading boughs: the leaves pinnate, with a very strong but not unpleasant smell: the leaflets three pairs (sometimes two or four), nearly equal, except that the odd one is larger; they are entire, smooth, and shining: the male flowers in close, pendulous, subterminating aments: the females scattered, frequently two or three together: fruit an ovate, coriaceous, smooth drupe, inclosing an irregularly grooved nut, which contains a four-lobed, oily, eatable kernel, with an irregular knobbed surface, and covered with a yellow skin. It is a native of Persia.

Martyn remarks, that as "they all vary again

when raised from the seed, and that as nuts from the same tree will produce different fruit: persons who plant the Walnut for its fruit, should make choice of the trees in the nurseries, when they have their fruit upon them."

There are several varieties, as the Oval Walnut, the Round Walnut, the Large Walnut, the Small-fruited Walnut, the Double Walnut, the Early Walnut, the Late Walnut, the Tender Thin-shelled Walnut, and the Hard Thick-shelled Walnut.

The second species has the leaves composed of two or three pairs of oblong lobes, terminated by an odd one; these are of a light green, and serrate; the lower pair of lobes are the smallest, and the upper the largest: the fruit is shaped like the common Walnut, but the shell is not furrowed, and is of a light colour. According to some, it is a tall tree. In North America, where it prevails, it is termed Hickory Nut-tree.

The third grows to a large size: the leaves are composed of five or six pairs of leaflets, which end in acute points and are serrate; the lower pair is the least, the others gradually increase, but the pair at top and the terminating leaflet are smaller: these leaves when bruised emit a strong aromatic flavour, as does also the outer cover of the nuts, which is rough, and rounder than that of the first sort. The shell is very hard and thick, and the kernel small, but very sweet to the taste.

Culture.—All the sorts are capable of being increased by planting the seed or nuts, which in the first sort should be of the best varieties when intended as fruit trees, after they are become perfectly ripe, and have been preserved in dry sand till about the end of February, either in slight drills, five or six inches apart in the rows, and a foot distant, or by the dibble, at the same distances, putting them in to the depth of two or three inches, the ground having been previously well dug over. When the plants have had two years growth in the seed-bed, they should be removed into nursery rows, shortening the tap roots, but preserving the tops entire, putting them at the distance of two feet and a half from row to row, and a foot and half in the rows: they should remain in this situation till they have attained five or six feet in height, training them with single stems; after which they may be removed into the situations where they are to grow.

When the trees are intended for timber, it is a good practice to plant them out at once where they are to grow, as they thrive faster, and form better trees.

In raising the Walnut for fruit, Mr. Boucher, however, recommends flat stones, tiles, sherds, or slates, to be buried eight inches deep,

under the nuts when they are set: the distance to be six inches, and the depth two inches. After two seasons they should be removed early in autumn, and planted fourteen or sixteen inches asunder, on the same kind of bottom, or any hard rubbish, to prevent them from striking downwards, and to induce them to spread their roots on the surface. At the end of two or three years this should be repeated again, making the bedding at the depth of fifteen or sixteen inches, and planting them two feet asunder: here let them remain three or four years, when they will be fit to remove for the last time. The soil for fruit-trees should be dry and sound, with a sandy, gravelly, or chalky bottom. The trees managed in this way, he says, will have higher flavoured fruit, ripen earlier, and bear a plentiful crop twenty years sooner than in the usual method. The best manure for them is ashes, spread the beginning of winter, the land having been first ploughed or dug over.

And as plants raised from the nuts of the same tree bear fruit of very different qualities, he advises the inarching one of the best sorts on the common Walnut-tree; by which method the planter is secure of his sort, and will have fruit in one-third of the time that he would obtain it from the nut. This method can, however, be practicable only in few situations. The length of time in which the Walnut bears well from the nut is about twenty years.

The nuts of the two other sorts are procured from America by the nurserymen.

The first sort is cultivated for ornament, as well as the nut or fruit which it affords. The fruit is used in two different stages of its growth; as, when green, to pickle; and when ripe, to eat the kernel. For the first purpose, the young green Walnut, when about half or near three parts grown, before the outer coat and internal shell become hard, is most excellent; for which they are generally ready in July or the following month, and should be gathered by hand, chusing such as are as free from specks as possible.

The fruit is discovered to be fully ripe by the outer husk easily separating from the nut, or by the husks sometimes opening, and the nuts dropping out; it is usually about the latter end of September, which, in trees of considerable growth, is commonly beaten down with long poles; for, as the Walnuts grow mostly at the extremity of the branches, it would, in very large spreading trees, be troublesome and tedious work to gather them by hand. As soon as gathered, they should be laid in heaps a few days to heat and sweat, to cause their outer husks, which closely adhere, to separate from the shell of the nuts; then be cleaned from the rubbish,

and deposited in a dry room for use, covering them over close with dry straw, a foot thick, where they will keep three or four months. They are always ready sale at market, in large towns, where, at their first coming in, they are brought with their husks on, and sold by the sack, or bushel, but afterwards cleaned, and sold both by measure and the thousand.

Plantations of these trees are therefore profitable, in their annual crops of fruit, while growing, and in their timber, when felled or cut down.

These, as well as the other sorts, may many of them be admitted into clumps and plantations, in large pleasure-grounds, for variety. After one or two years the other sorts are nearly as hardy as the first; but till that time should be protected against frosts in the winter season.

JUNIPERUS, a genus containing plants of the evergreen tree and shrub kinds.

It belongs to the class and order *Dioecia Monadelphica*, and ranks in the natural order of *Coniferae*.

The characters are: that in the male the calyx is a conical ament, consisting of a common shaft, on which are disposed three opposite flowers in triple opposition; a tenth terminating the ament: each flower has for its base a broad, short, incumbent scale affixed to the column of the receptacle: there is no corolla: the stamina have filaments (in the terminal floscule) three, (four to eight), awl-shaped, united below into one body: (in the lateral flowers scarce manifest:) anthers three, distinct in the terminal flower, but fastened to the calycine scale, in the lateral ones: in the females the calyx is a three-parted perianthium, very small, growing to the germ, permanent: the corolla has three petals, permanent, rigid, acute: the pistillum is an inferior germ: styles three, simple: stigmas simple: the pericarpium is a fleshy berry, roundish, marked on the lower part with three opposite obscure tubercles (from the calyx having grown there), and at the tip by three teeth (which before were the petals), umbilicated: the seed three ossicles, convex on one side, cornered on the other, oblong.

The species cultivated are: 1. *J. communis*, Common Juniper; 2. *J. Oxycedrus*, Brown-berried Juniper; 3. *J. thurifera*, Spanish Juniper; 4. *J. Barbadensis*, Barbadoes Juniper; 5. *J. Bermudiana*, Bermudas Juniper; 6. *J. Sabina*, Savin; 7. *J. Virginiana*, Virginian Juniper, or Red Cedar; 8. *J. Phœnicea*, Phœnician Juniper, or Cedar; 9. *J. Lycia*, Lycian Juniper, or Cedar.

The first is a low shrub, seldom rising more than three feet high, sending out many spreading tough branches, which incline on every

side, covered with a smooth, brown, or reddish bark, with a tinge of purple: the leaves narrow, awl-shaped, ending in acute points, placed by threes round the branches, pointing outwards, bright green on one side, and gray on the other, continuing through the year: the male flowers are sometimes on the same plant with the females, but at a distance from them; but they are commonly on distinct plants: the female flowers are succeeded by roundish berries, which are first green, but when ripe of a dark purple colour, continuing on the bush two years. It is common in all the northern parts of Europe.

The second species has the branchlets three-sided: the leaves sessile (by no means adnate), altogether as in the first sort, but larger in all the parts: berries rufescent, the size of a hazelnut: the height ten or twelve feet, branched the whole length: branches small and taper, having no angles, as most of the other Junipers have: the male flowers at the ends of the branches in conical scaly aments: the berries below from the side of the same branch: it is feathered from top to bottom, if left untouched from the first planting, or if not crowded with other trees: the short sharp-pointed leaves give the shrub a fine look; and the large brownish red berries have a handsome appearance when ripe. It is a native of Spain.

The third grows to the height of twenty-five or thirty feet, and sends out many branches, which form a sort of pyramid: the leaves are acute, lying over each other in four rows, so as to make the branches four-cornered: the berries very large, and black when ripe. It is a native of Spain.

The fourth species has been confounded with the Bermudas Cedar; but the branches spread very wide, the leaves are extremely small, and are every where imbricate: the bark is rugged, splits off in strings, and is of a very dark colour: the berries are smaller than those of the Bermudas Cedar, and are of a light brown colour when ripe. It is a native of the West Indies, where it rises to be one of the largest timber trees.

The fifth, or Bermudas Cedar, whilst young, has acute-pointed leaves, which spread open, and are placed by threes round the branches; but as the trees advance their leaves alter, and the branches become four-cornered: the leaves are very short, and lie over each other by fours round the branches: the berries are produced towards the ends of the branches, and are of a dark red colour, inclining to purple: the wood has a very strong odour. It is a native of America.

The sixth is divided into two species by Mil-

ler; the Common, or Cypress-leaved, and the Tamarisk-leaved, or Berry-bearing Savin. In the first the branches grow more erect, the leaves are shorter, and end in acute points, which spread outwards: it rises to the height of seven or eight feet, and produces great quantities of berries. The second sends out its branches horizontally, and seldom rises more than three or four feet high, but spreads to a considerable distance every way: the leaves are very short, acute-pointed, running over each other along the branches, with the ends pointing upwards: the berries are smaller than those of the first, but of the same colour, and a little compressed: the whole plant has a very rank odour when handled. It is a native of the South of Europe.

There is a variety with variegated leaves.

The seventh has the leaves mutually opposite by threes, fastened at the base by their inner side, in the new shoots imbricate in four rows, giving them the appearance of being quadrangular; the year following these spread from the branch at an acute angle, and appear to be disposed in six rows or longitudinal phalanges: the berry dark blue, covered with a white resinous meal. It is a native of North America, &c.

There are varieties, as the Swedish, or Tree Juniper, which rises to the height of ten or twelve (even sixteen or eighteen) feet: the branches grow more erect than those of the common Juniper; the leaves are narrower, end in more acute points, and are placed further asunder on the branches: the berries also are longer.

The Alpine, or Mountain Juniper, which has the leaves broader and thicker: the berries rather oval than spherical.

The eighth species grows with its branches in a pyramid: the lower ones have short, acute-pointed, grayish leaves, pointing outwards; but those on the upper branches are dark-green and imbricate, ending, however, in acute points: the male flowers are produced at the extremity of the branches, in a loose, scaly, conical ament, standing erect on a short peduncle: the fruit is sometimes upon the same tree, at a distance from the male flowers, but more generally on separate trees: the berries pale yellow when ripe, about the size of those of the first sort. It is a native of the South of Europe.

The ninth has the branches growing erect, and covered with a reddish-brown bark: the leaves small, obtuse: the male flowers at the ends of the branches in a conical ament; and the fruit single from the axils below them, on the same branch: the berries large, oval, and when ripe brown. It is a native of the South of France.

Culture.—All these plants, except the fifth sort, may be increased either by seeds, layers, or cuttings. The latter methods are proper for the Savin kinds.

The seeds or berries should be sown in beds of light earth, in the early autumn or spring, but the former is the better in light soils, in a warm sheltered situation, in the open ground, being well raked in. The beds should be kept perfectly clear from weeds, and the young plants be occasionally watered during the summer season. When the plants have had two years' growth in these beds, and are become strong, they should be removed into nursery rows at two feet apart, and a foot or eighteen inches distant in the rows. They should remain in these situations till of proper growth to be planted out where they are to remain.

The layers of the young branches should be laid down at either of the above seasons, and, when well rooted taken off, and planted in the nursery, in the same manner as the seedling plants.

The cuttings should be made from the young branches, and be planted in a shady border, in the latter end of summer, watering them occasionally till they have stricken good root; when they may be taken up with earth about their roots, and be managed in the same manner as by the other methods.

The plants raised in these last ways seldom grow so upright, or to so large a size, as in the seed method.

The common upright and striped Savins may likewise be increased by planting slips of the young branches; for the last sort the most variegated being made use of, in the latter end of summer, or in the autumn, in a shaded border, due water being given. When the plants are come up, they must be managed as the other sorts.

The fifth sort must be sown in pots or tubs, at the same seasons as the other sorts, being placed in a frame to have the protection of glasses when the weather is frosty and severe. As the seeds are long in coming up, the mould in the pots, &c. must remain undisturbed till they appear, being shaded from the sun, and slightly watered occasionally. The young plants should be kept quite free from weeds, and be duly watered till they have attained sufficient growth to be removed into separate small pots, filled with light earth, which is generally when from one to two years old. In removing them, they should have balls of earth preserved about their roots, and be watered, and placed in a warm situation. The best season for this is in the early spring. But it is of great advantage to plunge the pots in a mild hot-bed. They

must be protected in the winter, either in frames, or under a warm fence, the pots being plunged in the earth. When they have been removed into different larger pots till of sufficient large growth, they may be planted out where they are to grow, which should be in a warm situation. It is proper to shelter them the first two winters during severe frosts, by mats, or other similar coverings.

The proper periods for removing all the different sorts into the open ground, are in the early autumn or spring months.

These plants all succeed in the open ground, and grow in any common soil and situation, with other hardy plants of the tree kind, though they are the most prosperous in a light sandy soil, where the aspect is sheltered.

In placing these kinds of plants in the clumps and shrubby plantations, attention should be had to arrange them according to their degrees of growth, so as to exhibit a regular gradation of height, placing the low-growing sorts, as the common Juniper and Savin kinds, towards the fronts, and the other larger growing sorts more backwards, in assemblage with other ornamental shrubs and trees of the evergreen tribe; and some may be placed as single standards, on open spaces of short grass, in the pleasure-ground quarters. Some of the large-growing sorts may also be introduced into the forest-tree plantations; as they have a fine effect, and afford excellent timber for many uses, more particularly the Virginia Cedar, which arrives at a considerable size, especially when the under branches are trimmed off occasionally while young.

JUPITER'S BEARD. See *ANTHYLLIS*.

JUSTICIA, a genus containing plants of the shrubby and herbaceous kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a one-leaved perianthium, very small, five-parted, acute, upright, narrow: the corolla one-petalled, ringent: tube gibbose: border two-lipped: lip superior oblong, emarginate: lip inferior, of the same length, reflex, trifid: the stamina have two awl-shaped filaments, hid under the upper lip: anthers upright, bifid at the base: the pistillum is a top-shaped germ: style filiform, length and situation of the stamens: stigma simple: the pericarpium is an oblong capsule, obtuse, narrowed at the base, two-celled, two-valved: the partition opposite to the valves, gaping with an elastic claw: the seeds roundish.

The species cultivated are: 1. *J. sexangularis*,

E

Chickweed-leaved *Justicia*; 2. *J. Scorpioides*, Scorpion-tail Vera Cruz *Justicia*; 3. *J. Ectolium*, Long-spiked *Justicia*; 4. *J. Adhatoda*, Malabar Nut; 5. *J. hyssopifolia*, Snap-tree.

The first is an annual plant, with an upright stalk, having six angles, rising two or three feet high, and dividing into many branches: the leaves opposite, an inch and half long, and one inch broad; smooth, as are also the stalks: at each joint come out clusters of small bractes: long before the stalks decay, most of the leaves fall off, leaving only these bractes: the flowers are in small spikes at the side of the branches, sitting very close; they are of a beautiful carmine colour. It is a native of La Vera Cruz, &c.

The second species has a brittle stem, five or six feet high, sending out many branches: the leaves two inches long, and one inch broad, hairy, opposite: the flowers large, of a carmine colour, and ranged on one side of the spike. It is a native of La Vera Cruz.

The third has a roundish stem, compressed, jointed: the leaves petioled, smooth, acuminate, quite entire: the spike strobile-shaped, with spreading, upright bractes: it grows five feet high: the flowers grow in very long spikes from the end of the branches, and are of a greenish colour, with a shade of blue. It is a native of the East Indies.

The fourth species rises here with a strong woody stem to the height of twelve or fourteen feet, sending out many spreading branches: the leaves more than six inches long, and three inches broad, placed opposite: the flowers on short spikes at the end of the branches. It flowers in July, and is a native of Ceylon.

The fifth has the stem from three to four feet high, sending out branches on every side from the bottom, so as to form a pyramid; they are covered with a white bark: the leaves entire, near two inches long, and one third of an inch broad, smooth, stiff, deep green, opposite: at the base of the foot-stalks come out clusters of smaller leaves, of the same shape and texture: the peduncles short: the flowers white, with long calyxes: the capsules oblong, when ripe throwing out their seeds, whence the name of Snap-tree. It is a native of the Canary islands.

Culture.—These plants may be increased, some of them by seeds, and the others by layers and cuttings; but the latter modes are mostly practised, as the seeds are obtained with difficulty.

Where the seeds are capable of being procured, they may be sown in small pots filled with light fresh earth, in the early spring, being plunged in a hot-bed of bark, watering the

mould of the pots moderately when it becomes dry. As they often remain long before the plants appear, the pots should not be disturbed, but be kept in the hot-bed. When the plants appear, fresh air should be admitted in mild weather, and slight waterings given; and when they have attained a few inches in growth, they should be removed into separate pots filled with fresh earth, replunging them in the hot-bed, watering and shading them till they have taken fresh root; air being then freely admitted, and as the season grows warm, due waterings being given. As they advance in growth, they should be placed in larger pots, taking care not to overpot them, keeping them constantly in the hot-bed.

The layers should be laid down in the early spring, in pots filled with light earth, a little water being given at the time.

The cuttings may be made from the young shoots, and planted in pots filled with the same sort of earth in the later spring or summer months, giving them a little water, and plunging them in the hot-bed of bark in the stove, due shade being given.

When the plants have become perfectly rooted, they may be taken off, or removed into separate pots, keeping them constantly in the stove or green-house, according as they are more or less hardy. The two first sorts are the most hardy; the others succeeding best in the hot-house or stove.

The two first afford ornament and variety among the other potted plants of the less tender sorts, and the other among those of the stove kinds.

IVY. See *HEDERA*.

IXIA, a genus containing plants of the herbaceous, bulbous, and tuberous root perennial kind.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensateæ*.

The characters are: that the calyx is a spathe, bivalve, inferior, shorter than the corolla: valves oblong, permanent, the exterior wider, sheathing the interior: the corolla one-petalled, regular, superior: tube filiform, gradually enlarged, straight: border regular, bell-shaped, six-parted: divisions oblong, obtuse, equal, spreading: the stamina have three filaments, thread-subulate, inserted into the tube near the orifice, shorter than the corolla: anthers oblong, furrowed: the pistillum is an inferior, triangular germ: style simple, filiform, upright: stigma three, filiform: the pericarpium is an ovate capsule, three-sided, obtuse, three-celled, three-valved: the seeds several, roundish, smooth.



Drawn by J. Edwards

London Published Sep. 1853. by G. Knapp, Fleet Street

Engraved by F. Sargent

Ixia chinensis
1 Chinese Ixia

Iberis gibraltarica
2 Gibraltar Candy Tuft

The species cultivated are: 1. *I. Bullocodium*, Crocus-leaved Ixia; 2. *I. Chinensis*, Chinese Ixia; 3. *I. rosea*, Rose-coloured Ixia; 4. *I. bulbifera*, Bulb-bearing Ixia; 5. *I. aristata*, Bearded Ixia; 6. *I. flexuosa*, Bending-stalked Ixia; 7. *I. polystachia*, Many-spiked Ixia; 8. *I. maculata*, Spotted Ixia; 9. *I. crocata*, Crocus-flowered Ixia.

The first has a roundish bulb, placed on the withered bulb, double the size of a pea, white, covered with a bay-coloured skin: the leaves three or four, in the flowering plant radical, in the fruiting cauline, spreading horizontally, half a foot or thereabouts in length, smooth, sharpish: the stem solitary, upright, two inches high, above the uppermost leaf, convex on one side, flat on the other; in the fruiting plant a little higher, in the cultivated one sometimes half a foot in height: the spathe terminating, two-valved: leaflets narrow-lanceolate, acute, concave, opposite; one upright, green, almost the length of the corolla; the other a little shorter, green on the back, but otherwise membranaceous and pellucid, patulous, whence the flower becomes as it were lateral. It is inodorous, and a native of Italy, flowering about the middle of April.

It varies with white and yellow flowers, with purplish and yellow flowers, with blue and white flowers, with white flowers, and with variegated flowers.

The second species has the scape round, fistulous, jointed, upright, simple at bottom, panicle-dichotomous or trichotomous at top, smooth, almost the thickness of a finger, two feet high: the leaves alternate, embracing, equitant, acute, entire, striated, smooth, the lower a little longer, about half the length of the stem, a span long and more: the flowers from the tips of the branches of the panicle, in umbels, from three to seven, peduncled: peduncles striated, one-flowered, an inch long: the spathe under the divisions and the umbel, withered. In India, the stalks rise to the height of five or six feet, but in this climate they are seldom more than half that height. The flowers are of a yellow colour within, and variegated with dark red spots; the outside is of an orange colour: these appear in July and August, and in warm seasons are succeeded by seeds. It is a native of the East Indies, &c.

The third has an ovate bulb, smooth, sub-truncated: the scape three- (or four-) cornered, sheathed at bottom, branched, few-flowered, smooth, from a hand to a span in height: the leaves acute, grooved, smooth, the lowest, which is the longest, frequently double the length of the scape, or more, is lax and reflex;

the two or three others are about the length of the scape, and upright: the flowers at the ends of the branches rather large, coming out one after the other: the outer spathe ovate, green; inner lanceolate, acute, membranaceous, sheathing the capsule.

It varies with the three inner segments of the corolla yellow, and the three outer green; with the three inner white-yellow, the three outer greenish; with the three inner blue-white, the three outer greenish; with the three inner white, the three outer green; with corollas wholly yellow; or wholly blue, or rose-coloured with a yellow base; also in the size of the flowers.

The fourth species has the scape simple or branched, somewhat compressed, striated, smooth, sheathed at bottom with leaves, from a hand to a foot in height: the leaves nerved and striated, distich, upright, smooth, a span long: the flowers three or more, large, with the rachis between the flowers flexuose: the spathe nerved and netted, gray, with a dusky tip: tube of the corolla only a line in length: border divided beyond the middle, but not to the tube: segments large, ovate-oblong, very blunt, spreading.

It varies with the corolla purple, red and white, yellow; with the scape very short and simple, higher and branched, and bulbiferous.

The fifth has a netted bulb, the size of a hazel nut: the scape simple, round, upright, smooth, from a hand to a foot in height and more: the leaves four or five, linear, five-nerved, the middle nerve and edges thicker, acute, upright, shorter by half than the scape: the flowers pointing one way (very seldom one only) on two branches, often from five to nine on a scarcely flexuose rachis: the spathes submembranaceous, awn-toothed: the corollas white flesh-coloured.

It varies with the segments of the borders of the corolla of a deep and elegant purple-violet colour within, three of them of the same colour on the outside, but the three others alternately of a pale dirty violet; one of these with two on the side of it has a double band in the throat meeting at one end; and, according to Mr. Salisbury, with whitish corollas, having a purple star, violet-coloured and yellow. In Miller's figures, with the corolla of a beautiful purple on the outside, but white within, and the stem terminated by two or three flowers; with the stalk terminated by two large flowers; the outside of a violet colour, edged with white, and the inside pale blue; and with one flower, and the corolla of a most beautiful purple colour both within and without.

The sixth species has a very small round bulb: the leaves three or four, long, slender, grass-

like, dark green: the stem very slender, round, a foot and half high: at the top the flowers are collected in a spike sitting close to the stalk, each having a thin, dry spathe, which covers the capsule after the flower is fallen. The corolla is pure white, and small.

The seventh species has a bulb the size of a hazel nut: the leaves three or four, many-nerved, upright, smooth, half the length of the scape: the scape round, smooth, upright, many-spiked, from a foot to two feet in height: the branches alternate, capillary, upright, a finger's length: the flowers on the scape and branches in spikes, on a flexuose rachis of a finger's length: the spathes submembranaceous and awned. The flowers appear in May.

It varies with the corollas yellow and violet, of one colour.

The eighth species has the bulb double the size of a hazel nut: the leaves three, four, or five, many-nerved, half the length of the scape: the scape usually simple, seldom many-spiked, round, upright, from a span to a foot high and more: branches filiform, upright, or spreading very much: flowers in terminating spikes, on a flexuose rachis: spathes membranaceous, gray at the base, brown at the tip, somewhat jagged: the corolla, above the mouth of the tube, has a dusky spot at the base of the border.

According to Miller, the stalk is slender, stiff, a foot and half long, naked to the top, where it is terminated by a round bunch of flowers, each inclosed in an oblong spathe, which is permanent, and splits open on one side: the flowers are on short peduncles, deep yellow with a dark-purple bottom. It flowers in May and June.

The ninth has the bulb a little larger than a hazel nut: the leaves about five, reflex-subfalcate, many-nerved, from an inch to a finger's length, half or one-third of the length of the scape: the scape simple, round, or branched, somewhat flattened, flexuose, upright, smooth, from a hand to a span in height: the branches spreading very much, naked, like the scape: the bractes gray at the base, ferruginous at the tip, slightly toothed and jagged: the flowers pointing one way, handsome, bell-shaped, with a short tube, orange-coloured with a paler hyaline or transparent mark above the mouth of the tube; seldom two, but most commonly five or seven. It is one of the handsomest of the *Ixias*, and like other sorts becomes handsomer and more branched by cultivation.

It varies with a short, simple, few-flowered scape, and a dark spot above the windowed or hyaline one, with a lofty, many-spiked, many-flowered scape, and with bright red flowers.

Culture.—These plants may be increased by seeds or off-sets.

The seeds of such sorts as can be procured should be sown in pots filled with light earth, in the spring, plunging them in a mild hot-bed. When the plants have attained some growth, they should be removed into separate pots of the same earth, being placed under the protection of a frame till they have taken root. They should be placed during the winter in a hot-bed frame. They may afterwards be removed into warm borders, being protected from frosts in the winter, and a few retained in pots under the frame, or in a dry stove.

They are three or four years in flowering when raised from seeds.

The common way is therefore to increase them by planting off-sets from the roots, which are afforded in great plenty; the proper season for this is in the early spring, before the shooting of the root, when the roots should be removed, and the off-sets taken off and planted out.

The old roots should not be removed oftener than every three years.

When the stems and leaves decay to the roots in the borders in autumn, they should be covered over with tan a few inches thick, to protect them from frost and the depredations of mice.

The hardy sorts serve to adorn the borders in the open ground, and the other tender sorts among other potted green-house plants, that require protection in winter.

IXORA, a genus containing plants of the flowering shrubby exotic kind.

It belongs to the class and order *Terrandria Monogynia*, and ranks in the natural order of *Stellatæ*.

The characters are: that the calyx is a four-parted perianthium, very small, upright, permanent: the corolla one-petalled, funnel-form: tube cylindric, very long, slender: border four-parted, flat: divisions ovate: the stamina have four filaments, above the mouth of the corolla, very short: anthers oblong: the pistillum is a roundish, inferior, germ: style filiform, length of the tube: stigma two-cleft: the pericarpium a roundish berry, two-celled: the seeds by fours, convex on one side, cornered on the other.

The species cultivated are: 1. *I. coccinea*, Scarlet *Ixora*; 2. *I. alba*, White *Ixora*.

The first has a woody stem, five or six feet high, sending out many slender branches covered with a brown bark: the leaves opposite, or three or four at a joint: the flowers terminating in clusters; they have very long slender tubes, are cut into four ovate segments, and are of a deep red colour. It is a native of the East Indies.

The second species has a woody stem, six or seven feet high, sending out weak branches: the leaves are opposite, sessile: the flowers terminating in small clusters; they have long slender tubes, divided into four segments at top, and are white, without scent. It is a native of the East Indies.

Culture.—These plants may be increased by seeds, when they can be procured from the countries where they grow naturally, as they do not perfect them in this climate. They should be sown in small pots as soon as they arrive, and be plunged into a hot-bed, when they arrive in autumn or winter seasons, the pots being plunged in the tan-bed in the stove; but when they come in the spring, it is best to plunge them in a tan-bed under frames. The seeds sometimes come up in about six weeks, if they are quite fresh; otherwise they lie in the ground four or five months,

or longer. The earth should therefore not be thrown out of the pots till there are no hopes of their growing. When the plants come up, and are fit to remove, they should be each planted in a separate small pot, filled with light earth, being preserved in the green-house or stove.

They may also be increased by cuttings, which should be planted during the summer months, in small pots, and plunged into a moderate hot-bed, covering them close either with bell or hand glasses, to exclude the external air, shading them carefully from the sun in the heat of the day until they have put out good roots, when they should be parted, and each put into a separate pot, treating them as the seedling plants. Mr. Curtis thinks it probable, that these plants are less tender than is supposed.

They afford variety among other stove or green-house plants.

K Æ M

KADANAKU. See ALOE.

KÆMPFERIA, a genus containing plants of the herbaceous perennial flowery kind.

It belongs to the class and order *Monandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters are: that the calyx is a superior perianthium, obscure: the corolla is one-petalled: tube long, slender: border flat, six-parted: the three alternate divisions lanceolate, equal: the other two divisions ovate; the upper one two-parted: the divisions obcordate: all equal in length: the stamina have one membranaceous filament, subovate, emarginate: anther linear, doubled, entirely adnate, scarce emerging from the tube of the corolla: the pistillum is a roundish germ: style the length of the tube: stigma two-plated, roundish: the pericarpium is a roundish capsule, three-sided, three-celled, three-valved: the seeds are several.

The species cultivated are: 1. *K. Galanga*, Galangale; 2. *K. rotunda*, Round Kæmpferia.

The first is an annual, stemless, juicy plant: the root is bulbous, palmate, creeping, with ovate smooth lobes, and awl-shaped thick simple fibres: the leaves are broad-ovate, forming a ring next the ground, quite entire, smooth, with many longitudinal grooves, dark green, on short membranaceous, subterraneous petioles, embracing

K Æ M

the inner ones: the flower radical, solitary, sessile, juicy, very white, with a large violet spot in the middle. It is a native of the East Indies.

The second has the roots somewhat like those of the first, but shorter, growing in large clusters, covered with an ash-coloured skin, but within white: from the roots arise the leaves, which fold over each other at their base: they are six or eight inches long, and three broad in the middle, gradually ending in acute points; the flowers arise immediately from the roots, each having a spatha at bottom cut into two segments, which closely embrace the foot-stalk: they have six petals, the three lower which decline downward are long and narrow, the two upper are divided so deeply as to appear like a flower with four petals, and the side petal is bifid: they are of mixed colours, blue, purple, white, and red, having a fragrant odour. It flowers in July and August, and is a native of the East Indies.

Culture.—These plants are increased by parting the roots, and planting them out in the spring, before they send forth new leaves, in pots of light rich mould; keeping them in the hot-house, giving water plentifully in the summer, but sparingly in the winter season.

They afford variety in stove collections.

KALE. See **BRASSICA**.

KALMIA, a genus containing plants of the hardy evergreen shrubby kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a five-parted perianthium, small, permanent: segments subovate, acute, rather columnar: the corolla one-petalled, salver-funnel-form: tubecylindric, longer than the calyx: border with a flat disk; the margin upright, half-five-cleft: ten nectariferous hornlets projecting outwardly from the corolla, and surrounding it where the border of it is upright: the stamina have ten awl-shaped filaments, upright-spreading, rather shorter than the corolla, inserted into the base of the corolla: anthers simple: the pistillum is a roundish germ: style thread-form, longer than the corolla, bent down: stigma obtuse: the pericarpium a capsule, subglobose, depressed, five-celled, five-valved, five-partite: the seed numerous.

The species cultivated are: 1. *K. latifolia*, Broad-leaved Kalmia; 2. *K. angustifolia*, Narrow-leaved Kalmia; 3. *K. glauca*, Glaucous Kalmia; 4. *K. hirsuta*, Hairy Kalmia.

The first rises with a branching stalk to the height of ten or twelve feet, with very stiff leaves, which are two inches long and one broad, of a lucid green on their upper side, but of a pale green on their under: they have short foot-stalks, and stand without order round the branches: between these the buds are formed for the next year's flowers, at the extremity of the branches; these buds swell during the autumn and spring months, till the beginning of June, when the flowers burst out from their empalements, forming a round bunch, or corymbus, sitting very close to the branch: they are of a pale blush colour, the outside of the petal a peach colour. In its native soil it continues flowering a great part of the summer, and is highly ornamental. It is a native of Carolina.

The noxious qualities of this elegant shrub lessen its value.

The second species rises from three to six feet high, dividing into small woody branches, which are very close, and covered with a dark-gray bark: the leaves are stiff, about two inches long, and half an inch broad, of a lucid green, placed without order upon the branches, on slender foot-stalks: the flowers are in loose bunches on the side of the branches, upon slender peduncles: they are bright red when they first open, but afterwards fade to a blush or peach-bloom colour.

There are varieties, with pale and deep-red flowers, differing in their habit: the latter, the

most humble of the two, not only produces the most brilliant flowers, but in greater abundance. It is reputed poisonous to sheep and cattle in North America, where it is a native.

The third is much inferior in size to the first, rarely exceeding two feet in height. It is a native of Newfoundland, flowering in April and May.

The fourth species is usually in height from two to three feet, growing upright: the flowers are about the same size with those of the preceding, are of a purple colour, and grow in racemes: the stalk, leaves, and calyx are covered with strong hairs. It is a native of Carolina.

Culture.—These plants are increased by seeds, layers, and suckers.

The first sort is mostly raised from seeds procured from America, which should be sown in pots or boxes of light sandy mould, in the spring, plunging them in an easterly border, or in beds of light mould in the same aspect. When placed on a gentle hot-bed they succeed better. They must, however, be inured to the full air in summer, being sheltered during the winter from frost. When the plants have had two years' growth, they may be removed into separate pots, to be continued two or more years, when they may be planted out in the open ground in warm situations.

The second sort is mostly increased by layers, which should be made from the young shoots, and laid down in the early autumn. When they are well rooted, in a year or two, they may be taken off, and planted in pots separately filled with bog earth, or in a warm border of the same sort of earth. This is more hardy than the former.

The third sort is increased in the same way as the first, and requires similar management.

The fourth is preserved with difficulty in this climate, but may be raised by layers.

The most of the plants may likewise be increased by suckers, which should be taken off and planted in the spring, in nursery rows, for two or three years, when they may be removed to the places where they are to grow.

These plants, in the more hardy sorts, afford ornament and variety in the fronts of shrubbery borders and clumps; and in the more tender sorts, among other potted green-house plants.

KIDNEY-BEAN. See **PHASEOLUS**.

KIDNEY-BEAN TREE. See **GLYCINE**.

KIDNEY-VETCH. See **ANTHYLLIS**.

KIGGELARIA, a genus containing a plant of the evergreen shrubby kind.

It belongs to the class and order *Diœcia Decandria*, and ranks in the natural order of *Columniferae*.

The characters are: that in the male the calyx



Painted by Syd Edwards

London Published Jan 11806 by G. Kearsley Fleet Street

Engraved by F. Sanson

1 *Kalmia glauca*
 1 *Glaucous Kalmia*

2 *Linum arboreum*
 2 *Tree Flax*

is a one-leaved perianthium, five-parted, concave: divisions lanceolate, concave: the corolla has five lanceolate petals, concave, rather longer than the calyx, and forming with it a pitcher-shaped figure: nectary, glandules obtusely three-lobed; middle lobe largest, depressed, coloured, each growing to the claw of each petal: the stamina have ten filaments, very small: anthers oblong, shorter than the calyx, gaping at the tips with two holes: female, the calyx as in the male: the corolla as in the male: the pistillum is a roundish germ: styles five, simple: stigmas obtuse: the pericarpium is a leathery, globose capsule, rough, one-celled, five-valved: the seeds about eight, roundish, cornered on one side, covered by a proper coat.

The species cultivated is *K. Africana*, African Kiggelaria.

It is a tree exceeding the height of a man, with the trunk and branches gray: the leaves are alternate, lanceolate, petioled, smooth, stiff, and straight, sharply serrate, acute, spreading: the petioles roundish, without stipules, one eighth of the length of the leaves: at the back of the leaf, where the larger lateral vessels come out, in the sinus or axil, there is a slight pubescence with a cavity, which forms a prominence on the upper surface of the leaf. On the male plant, one or two branched peduncles bear several flowers, nodding, in a panicle; the petals are white, and the nectaries yellow. The female produces a single flower on a simple peduncle: the fruit is a globular, rugged, one-celled, berried capsule, with a thick coriaceous rind, pubescent on the outside, and rugged, with granular atoms. It grows naturally at the Cape of Good Hope, where it rises to be a tree of middling stature; but it does not grow to a great magnitude in this climate.

KITCHEN-GARDEN PLANTS, all such plants as are cultivated for the purpose of food.

NAMES AND SORTS.

Agaricus campestris, the field agaric or mushroom.

Allium, garlick, onion, leek, &c. Of the first kind, large white garlick—red garlick.

In the second, or romambole.

In the third or onion, common oval Strassburgh onion—great oval Portugal onion—flat white Spanish onion—flat red Spanish onion—silver-skinned onion—bulbless-rooted Welch onion.

In the fourth, chives, or cives.

In the fifth, escalot, or shallot.

In the sixth, or Canada tree-onion.

In the seventh, or the leek, broad-leaved London leek—narrow-leaved leek.

Culture.—The plants may be increased by seeds, layers, and cuttings; but the first is the best method, as they root sparingly by layers and cuttings.

The seeds should be sown in the early autumn, in pots filled with fresh loamy earth, plunging them in a hot-bed. When they have a few inches growth, they should be removed into separate small pots, replunging them in the hot-bed; and when well rooted they should be gradually hardened to the open air.

The layers should be made from the young shoots of the same year, laying them down in the summer.

The cuttings of the young shoots should be planted in the spring, immediately before the plants begin to shoot, in pots filled with soft loamy earth, being plunged in a very moderate hot-bed, and covered with glasses, to exclude the air; due shade being afforded, and little water given after the first planting. Such as strike root may be removed into separate small pots of loamy earth, and be exposed to the air in a warm sheltered situation, till the autumn, when they should be placed under the protection of the green-house, and managed in the same way as trees of the Orange kind.

They afford variety among potted plants of the green-house kind.

KING'S SPEAR. See ASPHODELUS.

KITCHEN-GARDEN, that sort of Garden which is principally destined to the growth of different sorts of culinary vegetables and roots.

The land designed for this sort of garden should be sufficiently spacious, of a good depth and quality of mould, dry, and at the same time well situated for warmth, and the influence of the sun. See GARDEN.

MODES OF CULTURE.

By the spawn of the root, or invisible seed, running in lumps of earth or dung, in the autumn.

By the cloves of the root.

By the root and bulbs from the stalk.

By seed annually, which should be sown at different times in the early spring months.

By dividing the roots, and planting them out in spring.

By offsets of the root, planted out in spring.

By offset bulbs of the root, and the bulbs at top of the stalk, planted out in spring.

By seed annually, which should be sown in the early spring.

NAMES AND SORTS.

Anethum, dill, &c., common dill.
Fennel—light-green-leaved—dark-green fennel—sweet-seeded fennel.

Italian fennel.

Angelica savita, common angelica.

Apium, parsley, celery, &c., parsley—common plane-leaved parsley—curled-leaved common parsley—broad-leaved, or large-rooted parsley.

Celery—common upright celery—upright celery with solid stalks—turnip-rooted spreading celery.

Asparagus officinalis, common asparagus.

Atriplex hortensis, garden orach—white-leaved garden orach—green orach—purple orach.

Beta vulgaris, beet—common culinary beet—green-leaved culinary beet—white beet—chard, or great white Swiss beet—mangel wurzel beet.

Red beet—large, long red-rooted beet—turnip-rooted red beet—red-rooted beet with green leaves—pale-red beet.

Borago, borage.

Brassica, the cabbage, cauliflower, broccoli, turnip, &c., the cabbage—small early summer cabbage—dwarf early sugar-loaf-shaped cabbage—large, hollow, sugar-loaf cabbage—early Russia cabbage—common round white cabbage—long-sided hollow cabbage—oval hollow cabbage—flat-topped cabbage—musk-scented cabbage—giant cabbage—red cabbage.

Savoy cabbage—common green curled Savoy—large green Dutch Savoy—yellow Savoy.

Laciniated, and other open-leaved cole—green curled borecole—red curled borecole—thick-leaved curled borecole—finely fringed borecole—broad, erect, curled-leaved Siberian borecole, or Scotch cole, or kale, red and green—common plane-leaved green colewort.

Turnip cabbage—turnip cabbage with the turnip above ground—with the turnip under ground.

The cauliflower—early cauliflower—late cauliflower.

Italian *brassica*, or broccoli—early purple broccoli—late large purple broccoli, comprehending varieties, with blue, brown, green, and yellowish heads—dwarf purple broccoli—white or cauliflower-broccoli—black broccoli.

The turnip—early Dutch turnip—white round turnip—green-topped turnip—red-topped turnip—yellow turnip—oblong white turnip—long white-rooted French turnip—round purple French turnip.

Calendula officinalis, common marigold.

Cichorium endivia, endive—green curled endive—white curled endive—broad-leaved Batavian endive.

MODES OF CULTURE.

- By seed annually, sown in the spring.
- By seed sown in spring; also by slipping the old roots, and planting them out in the autumn.
- By seed annually, sown in the spring.
- By seed annually, sown in spring.
- By seed sown in spring.

By seed sown in the spring, for transplanting in summer and autumn.

By seed sown in the autumn; and when once raised, the roots abide for some years.

By seed annually, sown in the spring.

By seed annually, sown in the spring months.

By seed annually, sown in the early spring.

By seed annually, sown in autumn or spring.

By seed annually, sown at different times in spring and autumn, for use all the year, by having the plants set out at various times.

By seed annually, sown in spring, for autumn and winter use.

By seed annually, sown in spring and summer, for plants for autumn and winter use.

By seed, sown annually in spring and summer.

By seed sown annually, in spring and autumn, for plants for summer and autumn use.

By seed, sown in spring and beginning of summer, for plants for autumn, winter, and spring use.

By seed sown in spring and summer, for plants for use most part of the year.

By seed sown annually, in spring, summer, or autumn.

By seed sown annually, in summer, from May till July, for plants for autumn and winter use.

NAMES AND SORTS.

Cochlearia armoracia, horse-radish.

Crambe, sea-cabbage or colewort—the different varieties.

Cucumis, cucumber and melon—the cucumber—early short prickly cucumber—early cluster-cucumber—long, green, prickly cucumber—long, white, prickly cucumber—long, smooth, green, Turkey cucumber—large, smooth, white cucumber—large, smooth, green, Roman cucumber.

The melon—Romana melon—Cantaleupe melon; varieties of each; and several other sorts.

Cucurbita, the gourd and water melon.

Cynara, artichoke and cardoon—the common artichoke—globular-headed, red Dutch artichoke—oval-headed, green French artichoke.

The common cardoon.

Daucus carota, the carrot—orange-coloured carrot—red carrot—yellow carrot—white carrot.

Helianthus tuberosus, tuberous sun-flower, or Jerusalem artichoke.

Hyssopus officinalis, common hyssop—the several different varieties.

Lactuca, lettuce—early green cabbage-lettuce—white cabbage-lettuce—brown Dutch cabbage-lettuce—great admirable cabbage-lettuce—green and white ball-cabbage-lettuce—green cos-lettuce—white cos-lettuce—black cos-lettuce—spotted Aleppo cos-lettuce—brown Cilicia lettuce—imperial lettuce—red capuchin lettuce—green capuchin lettuce—curled lettuce.

Lavandula, lavender—spike-flowered common lavender—common narrow-leaved—broad-leaved—blue-flowered—white-flowered—and dwarf lavender.

Stoechas, or French lavender.

Lepidium sativum, garden-cress—common small-leaved—broad-leaved—curled-leaved.

Melissa officinalis, balm—common balm.

Mentha, mint, penny-royal, &c. green common spearmint—curled-leaved spearmint—variegated spearmint.

Peppermint.

Penny-royal.

Ocimum Basilicum, basil—common sweet basil—several varieties.

Origanum, marjoram—common, wild, perennial pot marjoram—winter perennial sweet-marjoram—marjorana, or annual sweet-marjoram.

Vol. II.

MODES OF CULTURE.

By pieces of the roots planted out in spring, for use most part of the year.

By seed sown in spring; but when once raised, the roots remain for years, sending up shoots for use in spring and summer.

By seed sown annually, at different times, on hot-beds, in the early spring and summer.

By seed sown annually, at different times, on hot-beds, in the spring months.

By seed sown annually, in the spring season.

By suckers from the sides of the old plants, in spring, of many years' duration.

By seeds sown annually, in the early spring.

By seed sown annually, in spring, summer, and autumn, for use most part of the year.

By pieces of the root planted annually, in the spring season.

By seed sown in spring, and by planting slips and cuttings of its branches.

By seed sown annually, at different times, in spring, summer, and autumn, for plants for setting out for use most part of the year.

By slips planted out in spring, which are of many years' continuance.

By planting slips or cuttings, and by seed, which are of many years' duration.

By sowing seed at different times of the year, according as the plants are wanted.

By dividing and planting the roots in spring or autumn, which are of many years' duration.

By dividing the roots, by young plants, and by cuttings of the stalks, planted out in spring, and which continue many years.

By roots and plants, &c. like the former.

By dividing and slipping the plants, as for the mint, and planting them out.

By seed sown in spring, on a hot-bed, the plants being afterwards planted out.

By sowing seeds in spring, and the two former also by slipping the roots, and planting them.

NAMES AND SORTS.

Pastinaca sativa, parsnep—common garden parsnep.

Phaseolus vulgaris, common kidney-bean—dwarfs and runners. Dwarf kinds—early white—early yellow—liver-coloured—speckled dwarf—Canterbury white dwarf—Battersea white dwarf—large white dwarf—cream-coloured dwarf—black dwarf—sparrow-egg dwarf—amber-speckled dwarf.

Running kinds—scarlet runner—white variety—large Dutch runner—Battersea white runner—negro runner—variable runner.

Pisum, the pea—Charlton pea—golden Charlton—earliest golden Charlton—long Reading hotspur—Masters' hotspur—Spanish morotto—green nonpareil—early dwarf marrowfat—large marrowfat—green rouncival, or union—white rouncival—Ledman's dwarf pea—small sugar pea—large sugar pea—cluster pea—crown pea—egg-pea—sickle pea, &c.

Portulaca oleracea, purslane—green purslane—golden purslane.

Poterium Sanguisorba, burnet—common garden burnet.

Raphanus sativus, the radish—short-topped early radish—long-topped radish—deep-red radish—pale-red, transparent, mild radish—salmon-coloured radish—small white turnip-rooted radish—small red turnip radish—large, white, turnip-rooted Spanish radish—large, black, turnip-rooted Spanish radish.

Rosmarinus, rosemary—some varieties.

Rumex acetosa, sorrel—common long-leaved sorrel—round-leaved French sorrel—barren sorrel.

Ruta graveolens, rue; several varieties.

Salvia, sage, clary, &c. The sorts are—common sage—red sage—broad-leaved green sage—narrow-leaved green sage—broad-leaved hoary sage—sage of virtue—wormwood sage, &c.

Clary.

Satureja, savory—winter perennial savory—summer annual savory.

Scandix Cerefolium, chervil—annual garden chervil.

Scorzonera, scorzonera—Spanish scorzonera.

Sinapis, mustard—white mustard—black mustard—field or wild mustard; the former to use young in salad, and the two last for their seeds, to make the table sauce called mustard.

Sium sisarum, sisarum or skirret.

Smyrnum Olusatrum, Alisanders, or common Alexanders.

MODES OF CULTURE.

By seed sown annually, in spring, for winter use.

By seed sown annually, at different times from April till July or the following month.

By sowing the seed like the former, but principally in the summer months.

By seed sown annually, at different times from October till June, but principally in the early spring months.

By seed sown at different times in April and May.

By seed sown in autumn or spring, and parting the roots.

By seed sown at different times from Christmas till July or August; but the latter sorts sown principally in June and July, for autumn and winter use.

By planting layers, slips, and cuttings, in spring.

By parting the roots, and the first sort also plentifully by seed.

By planting slips and cuttings; also by seed. By planting slips, in April, May, and June; also by sowing the seed in the spring season.

By seed sown annually in the spring.

Both by seed sown in the spring season, and the former also by planting slips.

By seed annually, in August, for winter and spring use, or sown also in spring and summer, for succession crops.

An eatable root, raised from seed sown in spring.

By seed in spring; or, if for sallads, at any time of the year.

An eatable root, raised by planting offsets commonly, of the root, also by seeds.

By seed annually in spring.

K N A

NAMES AND SORTS.

Solanum, night-shade, furnishing the potatoe and tomatoe—tuberous-rooted *solanum*, or potatoe—the common round red potatoe—early round red—oblong red—deep red—pale red—rough red—white kidney-shaped—large red-ended kidney—white round—white cluster—prolific American.

Tomatoe, or love-apple; varieties.

Spinacia, spinach—round, thick-leaved, or smooth-seeded—triangular-leaved, or prickly-seeded; the former for spring and summer crops, the latter to stand the winter.

Tanacetum vulgare, common tansy.

Thymus vulgaris, common thyme—the varieties with broad leaves—with narrow leaves—with striped leaves.

Tragopogon porrifolium, salsafy.

Tropaeolum, Indian Cress, or nasturtium—*nasturtium minus*—*nasturtium majus*; their flowers for garnish and sallads, and their seeds to pickle.

Valeriana Locusta, corn-sallad, or lamb's-lettuce.

Vicia Faba, the bean—early Mazagan—early Lisbon—long-pod—Turkey long-pod—toker bean—Sandwich bean—Windsor bean—white-blossomed—red-blossomed—Spanish bean—nonpareil bean—dwarf fan bean, very low.

See the different GENERA.

KNAUTIA, a genus containing plants of the herbaceous, annual, and biennial kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregate*.

The characters are: that the calyx is a common perianthium, containing the floscules disposed in a simple orb, simple, cylindric, oblong, upright: divisions awl-shaped, approximated, of the number of the floscules: perianthium proper, very small, crowning the germ, quite entire, coriaceous, pervious at top: the corolla is universal, equal: proper one-petalled, unequal: tube the length of the calyx: border unequal, four-cleft; the exterior segment larger and ovate: the stamina have four filaments, longer than the tube of the corolla, inserted into the receptacle: anthers oblong, incumbent: the pistillum is an inferior germ: style filiform, length of the stamens: stigma thickish, two-cleft: there is no pericarpium: the seeds solitary, four-sided, crowned with the down, and covered with the proper involucre of the flower:

K N A

MODES OF CULTURE.

By planting pieces of the roots, or the roots whole, in spring; also by sowing seed occasionally to obtain new varieties.

By sowing the seed annually, on a hot-bed, in the spring.

By sowing seed annually, in spring, summer, and autumn, for use most part of the year.

By parting the roots, and planting in spring or autumn.

By sowing seeds in March and April; also by planting slips of the root and branches, and by cuttings; but seed is the only way to raise a quantity of the common sort; and the other methods to continue the varieties, or for a general supply.

An esculent root, by seeds annually in spring.

Raised annually from seeds, sown at different times in spring.

By seed sown in spring and autumn.

By seed sown annually, at different times from October until June, but principally in the early spring months.

the receptacle common, scarcely remarkable, flat, naked.

The species cultivated are: 1. *K. Orientalis*, Oriental Knautia; 2. *K. Propontica*, Levant Knautia.

The first rises with an upright branching stalk four feet high: the branches terminated by single peduncles, each supporting one flower, with the florets of a bright-red colour: the leaves on the middle of the stem are pinnatifid; the rest only serrate: the flowers radiate, with five florets (four). It is annual, and a native of the Levant, flowering from June to September.

The second has the stem biennial, the thickness of a finger, two feet high, villose: the leaves somewhat hairy, rugged; and serrate, except the upper ones, which are quite entire, and a span long: the calyxes oblong, cylindrical, consisting of eight or ten lanceolate leaflets, awl-shaped at the tip: corollas not longer than the calyx, four-cleft; the marginal ones larger, with the outer segment larger, purple: middle corollas often four, smaller, less irregular: anthers pur-

K N A

ple: the filaments and pistils are white. Found in the Levant.

Culture.—These plants may be easily increased by seeds, which, when permitted to scatter in the autumn, produce good plants. They may afterwards be taken up, and planted in the borders of pleasure-grounds, among low shrubs near the walks. The plants in this way live

K N O

through the winter, and flower in June. There is no culture required but to keep the plants clean from weeds. The seeds fall as soon as they are ripe.

They afford variety among other hardy flowering plants of similar growths.

KNEE-HOLLY. See *RUSCUS*.

KNOT-GRASS. See *ILLECEBRUM*.

L A C

LABRADOR TEA. See *LEDUM*.

LABURNUM. See *CYTISUS*.

LABYRINTH, a sort of maze or wilderness plantation, abounding with hedges and walks, distributed into many windings and intricate turnings, leading to one common centre, extremely difficult to be found out, designed by way of amusement.

It is commonly formed with hedges, in double rows, leading in various twistings and turnings, backward and forward, with intervening plantations and gravel-walks alternately between hedge and hedge. The great object is to have the walk contrived in so many mazy intricate windings, as to cause much labour and difficulty to find out the centre, by meeting with frequent stops and disappointments, as the hedges must not be crossed or broken through. In a well-contrived Labyrinth a stranger often entirely loses himself, so as neither to find his way to the centre, or out again the way he came in.

They are now, however, rarely introduced in modern garden designs; and scarce to be seen, except in some old gardens.

The hedges for this use are usually of hornbeam, but may be of beech, elm, or any other sort that can be kept in neat order by clipping. The walks should be five feet wide at least, laid with gravel, and neatly rolled; and the trees and shrubs to form the thicket of wood between the hedges of any of the hardy kinds of the deciduous tribe, interspersed with some evergreens. In the middle, a space should be left open as the centre.

Small Labyrinths are occasionally formed with box edgings, and borders for plants, and alleys for walking in, in imitation of the large ones, and which have a good effect in small garden-grounds.

LAC, or GUM LAC. See *CROTON*.

LACE-BARK. See *DAPHNE*.

L A C

LACHENALIA, a genus containing plants of the bulbous-rooted kinds.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla has six petals, erected into a tube, oblong, connate at the base, unequal: the three exterior ones shorter, often callous at the tip: the stamina have six awl-shaped, upright filaments, growing to the base of the petals, and of the same length with them: anthers oblong: the pistillum is a superior subovate germ: stigma awl-shaped, length of the stamens: stigma simple: the pericarpium is a subovate capsule, three-winged, three-celled: the seeds several, globose, affixed to the receptacle.

The species cultivated are: 1. *L. orchoides*, Spotted-leaved Lachenalia; 2. *L. pallida*, Pale-flowered Lachenalia; 3. *L. tricolor*, Three-coloured Lachenalia.

The first has a roundish, whitish bulb: the whole of the plant is smooth: the leaves usually two from the bulb, from six inches to a foot in length, one always much narrower than the other, sharpish, thick, spreading at top, flattish, sheathing and channelled at bottom, rough and cartilaginous at the edge, dirty green, marked with lines on the inside, and having dusky spots scattered over them: the scape round, upright, pale green with dusky spots, commonly longer than the leaves: the bractes lanceolate, acuminate, concave at the base, spreading very much, white: the flowers are almost upright; the upper ones in the spike abortive. It is a native of the Cape.

In the second species the bulb is roundish, flattened a little, the size of a hazel nut: the root-leaves two, a foot long and more, acute, channelled, and sheathing at bottom, flat at top, linear-lanceolate, almost equal in length, one

near an inch in width, the other much narrower, deep green on both sides, unspotted, shining, quite entire, and not rough about the edge: the scape round, shining, pale green, unspotted, almost upright, weak: the raceme upright, three inches long, with about twenty flowers, somewhat remote, and inodorous: the bractes sessile, concave, acuminate, whitish: the pedicels one-flowered, round, almost upright, the length of the bractes at least: petals whitish, the three outer wholly green above the middle, the inner marked there only with a green line. It is a native of the Cape.

In the third the leaves two, radical, lanceolate, like those of the common white lily, thin, not fleshy, dusky-spotted on the upper surface: the scape round, like that of the garden hyacinth, scarcely a foot high, dusky-spotted: the flowers alternate: the petals lanceolate, unequal; the three outer fastened to the inner ones, which do not at all cohere at the base: the filaments declining, inserted into the receptacle: the anthers blood-red: stigma white: the stem is almost comose, with abundance of awl-shaped bractes that spring out below the upper rudiments of the flowers.

It varies with yellow, saffron-coloured, blood-red purple at the tip, and greenish yellow corollas; also in the proportion between the inner and outer petals; and in the breadth of the leaves. It is a native of the Cape.

Culture.—These plants may be increased by offsets from the bulbs, and by seeds, when they are produced.

The offsets should be planted out in pots of light fresh earth, when the bulbs are in a state of inactivity of growth, placing them in a warm border to be covered with hand glasses, or, what is better, in a dry stove or green-house.

They bear forcing tolerably, and their flowering is much promoted by being preserved in the warmth of the stove.

They afford variety among collections of potted bulbous-rooted flowering plants.

LACTUCA, a genus containing a plant of the herbaceous annual kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Semiflosculosæ*.

The characters are: that the calyx is common, imbricated, cylindric: scales very many, sharp, membranaceous on the margin: the corolla compound, imbricated, uniform: corollets hermaphrodite, very many, equal: proper one-petalled, ligulate, truncated, four- or five-toothed: the stamina have five capillary filaments, very short: anther cylindric, tubular: the pistillum is a subovate germ: style filiform, length of the

stamens: stigmas two, reflex: there is no pericarpium: calyx converging, ovate-cylindric: the seeds solitary, ovate, acuminate, even, compressed: down capillary, on a long stipe attenuated below: the receptacle naked.

The species is *L. sativa*, Common Garden Lettuce.

It has the leaves large, milky, frequently wrinkled, usually pale green, but varying much in colour, form, &c. in the different varieties: the stem strong, round, two feet or three quarters of a yard in height, bearing abundance of small yellow flowers. Its native place is unknown; and it is not improbable but that it may be improved by cultivation from one of the wild sorts.

There are several varieties cultivated: the principal of which are, of the Cabbage Lettuce kind, the Hardy Green, White Honey, Great Admirable White, Brown Dutch, Small Early, White Ball, Green Ball; and of the Coss Lettuce kind, the Green Coss, White Coss, Egyptian Coss, Spotted Coss, Black Coss, Brown Cilicia, Green Cilicia, Red Capuchin, Green Capuchin, Large Imperial, the Roman, the Prince: but the three or four first of the different sorts are the most valuable, and it is of much consequence to have the best kinds.

Culture.—This species, and all the varieties, are raised by sowing the seed annually, at different times, as in February and the three following months, for the summer supply of plants; and in August and the following month, for the autumn, winter, and very early spring supplies.

These different sowings should be performed upon beds of fine light dry earth, in an open situation, and exposed to the sun. Some of the late sowings may be made under hand glasses, or in frames or boxes, in order to have the young plants protected from frosts. Each of the varieties or sorts should be sown separately, and distinct from the others, and be slightly raked in.

It is sometimes the practice to sow them among other low growing crops, such as radishes, spinach, onions, &c. to save ground; but this should always be avoided as much as possible, as a very small portion of land is sufficient for raising large supplies of plants.

For the very early spring use, as open Lettuces, the early white cabbage sorts are the most proper; but for the main crops, to remain for full growth, the principal sorts of the Coss and Cabbage kinds must be employed.

When the plants appear, they must be kept perfectly free from weeds, and properly thinned. As they attain a proper growth, as three or four inches in height, some of the different sorts

must be planted out into beds in the open ground, drawing them up carefully, and planting them immediately. This work should be performed by a line and small dibble, in rows, a foot or more distant, with the same space from plant to plant. The quincunx mode is mostly adopted, which affords the most room, and at the same time has the neatest appearance. As soon as the planting is finished, the whole should be well watered; and when the weather is dry, repeated once or twice.

By thus planting out the several sorts at different times, at the distance of three weeks or a month, from the early spring till the latter end of the autumn, due successions of good Lettuces may be provided.

In the summer plantings out, when the weather proves very dry, it is sometimes the practice to plant them in small drills, in order to preserve the moisture more effectually.

After the beds of the different principal sowings have been considerably thinned by the several transplantations that have been made from them, the plants that remain may be set out to proper distances by the hoe, and left to take their full growth.

When the plants of the main spring and summer crops have attained a pretty full growth, especially those of the Coss kinds, it is necessary to tie the leaves of them up with bass pretty close, when the plants are quite dry, in order to blanch the inner parts, and render them perfectly crisp and tender.

Culture in the winter and very early spring crops.—For this purpose some seed of the Hardy Green and White Cabbage sorts, and the Brown Dutch, and White and Green Coss kinds should be sown about the middle of August, and beginning of September, in open situations, when the plants will come up in a week or ten days, and about the end of September; and in October, a parcel of the best plants of each sowing should be planted out in a warm dry situation, five or six inches asunder; and at the latter period some in shallow frames, to be covered with glasses on cold nights, and in bad weather; or under hand-glasses, or in a bed arched over with hoops or rods, to be covered with mats in winter frosts.

Under either of the above shelters the plants should have the free air in mild dry weather, covering them in cold nights with proper covers, especially after this month; also in all very cold, and in very wet weather, day or night, particularly those in the frames and under glasses; and those in hand-glasses may have the glasses almost constantly over them in winter, tilting up one side in mild weather, only setting them

entirely off in fine mild dry days; but in sharp frosty weather keeping those under every kind of shelter quite close; allowing also additional covering of mats or litter, when the frost is very intense. Those in the borders may be defended by some light litter; but the covering should never be suffered to remain longer on any of the crops than the bad weather continues, the free air being admitted every mild day.

In this method Lettuces may be had the greatest part of winter and early in spring, particularly the Cabbage sorts: those planted out first will be fit for use in November and December, and the second plantings come in towards Christmas, and, being sheltered by the glasses, continue coming in for use till succeeded by the other latter autumn sowings; being careful that, as any are gathered out of the frames or glasses, others be removed from the borders to fill up the vacancies, whereby the glasses may be constantly supplied during the winter season.

It is sometimes the practice where Lettuces are intended to be planted in frames late in autumn, for winter use, to have a moderate hot-bed made for their reception, in order that they may be well forwarded in the beginning of winter; and if the heat is continued moderately by aid of linings, allowing plenty of air in mild weather, the plants may be very fine by Christmas or a little after.

Culture in the winter standing spring crops.—In order to have good Lettuces for spring use, some seed should be sown toward the middle and latter end of August, for the plants to stand the winter, some where sown, others transplanted into warm borders, to stand without any other shelter than that of the walls or other fences; and another sowing should be performed about the middle of September, to provide plants for pricking out under frames, to have the shelter of the glasses all winter, as a reserve in case those in the borders are destroyed; where both stand, one may succeed the other as crops.

In the first case a quantity of the best plants, when two or three inches high, should be planted out towards the latter end of October, into a south border, under a wall, &c. and in some other warm dry situation, in rows six inches asunder, and four inches in the rows; or some close under a south wall, or other fence, in a foot-wide space all the way along, pricking them therein four or six inches distant; as they will have a better chance of standing the winter than those situated more distant from the shelter of the wall. In each method the plants are to remain to take their chance all winter: out of the whole many of them will probably escape

the frost; but in very severe weather they may be protected by a light covering of dry long litter, which should be removed again in due time when the frost breaks. In March or April, if they remain too thick, some should be thinned out and planted in another place, in rows twelve or fifteen inches asunder: the crops thus wintered in the open ground, come in for use in April and May, to succeed those sown in autumn, and sheltered occasionally all winter, and will remain good till the spring sown plants are ready for use.

In the latter case, or those sown in September, to be wintered in frames, they should be planted about the latter end of October, or beginning of the following month, in rows, from the back to the front of the frame, three inches distant, closing the earth well about each plant, finishing with a moderate watering all over the plants, and putting on the glasses to promote their more speedy rooting afresh, shoving the lights, however, two or three inches down, to give vent to the moist vapour arising from the mould; but when the plants have taken fresh root, and are set to growing, the full air should be admitted every mild dry day, by taking the glasses entirely off, which must be continued throughout the winter season, in all dry mild weather, but putting them on every night in cold or very wet weather; also in the day-time when great rains prevail; and in frosty weather keeping the glasses always on, except in the middle of sunny days, and when the frost is but slight; using also other coverings of mats or long litter over the glasses, and around the sides of the frame, when the frosts are very severe; during the winter keeping all decayed leaves clean picked off; and as the spring and warm weather advance, letting them have the benefit of warm showers. In this way they may be effectually preserved, if those in the open ground should be destroyed by the frost or excessive moisture. About March some of them should be transplanted into the open ground, in rows, a foot asunder, watering them moderately till fresh rooted; leaving a crop remaining in the frames or winter-bed, a foot apart, to stand to cabbage; which will arrive to perfection a considerable time before the transplanted ones, and those that have been fully exposed all winter, are ready. Where frames cannot be spared, a quantity of the plants may be pricked out under hand- or bell-glasses in autumn, to stand the winter, either by themselves for a full crop, or some under the hand- or bell-glasses, that are placed over early cauliflowers, as practised by the London gardeners, planting them round just within the glasses, and managing them as di-

rected for those in the frames; or for want either of a sufficiency of frames or hand-glasses, a quantity may be planted out in October, in four-feet wide beds, in a warm situation, arched over with hoops or rods, to cover with mats and litter in bad weather. In this way they have a better chance of surviving the winter than those fully exposed; and in spring transplanting a quantity, by way of thinning, into other beds, as directed above.

Saving seed.—For this purpose some of the best cabbaged early plants of all the sorts should be chosen, as those of the latter crops rarely run soon enough to ripen seeds perfectly before they are attacked by the autumnal rains and cold, which greatly retard the ripening of the seed.

It is likewise of importance to have the different varieties intended for seed at some distance from each other, as when too near together, the farina of the different sorts may mix and fecundate one another, and thereby degenerate plants be produced.

The seed usually ripens in August and September, but that of different plants rarely equally together; so that, as it arrives to perfection, the respective stems, &c. of ripe seed should be pulled up or cut off in dry days, and spread upon a cloth, or tied in small bunches, and hung up across lines in a dry airy place for a week or two, for the seeds to become dry and harden; then beaten or rubbed out, and cleaned from the down and other rubbish, and exposed upon cloths a few days to dry for keeping; being afterwards put up in bags for use, and hung in a dry room.

These plants may in general be considered as annuals and biennials; as those sown in spring and summer attain perfection, run up to seed, and perish the same year; while the autumn sowings stand all winter until the spring following, when they attain perfection, shoot up to seed, and perish root and branch. All the sorts are sufficiently hardy to grow in any good dry common soil, in a free situation open to the sun and air.

The use of these plants is principally in sallads, when arrived at full growth and cabbaged, that the inner leaves become blanched, crisp, and sweet; and sometimes also the young open plants of the Cabbage Lettuce sorts are used in winter and spring, till the other general crops arrive at perfection. Young open Lettuces are also often used as small sallad herbs, sowing them thick in rows, like cresses, &c. and gathering them in the same manner; but this mode is more particularly practised in winter and early spring. They, however, in general, do not eat any way so crisp, sweet, and palatable as when fully cab-

bagged. The fully cabbaged Lettuces are also excellent for stewing and for soups, as well as many other purposes.

LADANUM. See CISTUS.

LADIES' BOWER. See CLEMATIS.

LADIES' MANTLE. See ALCHEMILLA.

LADIES' SLIPPER. See CYPRIPEDIUM.

LAGERSTROEMIA, a genus containing a plant of the exotic tree kind, for the greenhouse.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Salicaceæ*.

The characters are: that the calyx is a one-leaved, six-cleft, bell-shaped perianthium, rather acute, smooth, permanent: the corolla has six ovate, obtuse petals, crisped, undulated, contorted: claws filiform, longer than the calyx, inserted into the receptacle: the stamina have very many filiform filaments, longer than the calyx, inserted into the calyx below the germ: the six exterior ones are twice the thickness of the rest, and are longer than the petals: anthers oval, incumbent: the pistillum is a subglobose germ: style filiform, length of the longer stamens: stigma simple: the pericarpium is a subglobose capsule, crowned with the style on its bluntish top, six-furrowed, six-celled, six-valved, the dissepiments coalescing with the sutures: the seed several, ovate, awl-shaped at the base, compressed, adhering to a central hexagonal pillar.

The species cultivated is *L. Indica*.

It has the trunk about a fathom high, or somewhat more, smooth all over: the branches alternate, somewhat angular, flexuose, rigid, spreading: the branchlets four-cornered: the leaves alternate, subsessile, on the twigs ovate, on the branches oblong, obtuse, entire, nerved, stiffish, from half an inch to an inch in length: the flowers in a decomposed, trichotomous, naked, spreading panicle at the ends of the twigs. It is a native of the East Indies, &c. flowering from August to October.

Culture.—This plant is capable of being increased either by layers or cuttings of the young branches.

The layers should be made from the young shoots of the preceding summer, and be laid down in the autumn. When they are well rooted in the succeeding autumn, they should be taken off and planted out in separate pots.

The slips or cuttings should be made from shoots of the same year's growth, and be planted out early in the summer, in pots of light earth, being plunged in a bark hot-bed, and covered with small bell hand-glasses, due shade and water being given. When well rooted in

the spring following, they may be taken up and planted in separate pots, filled with light mould, being afterwards managed as other green-house plants.

They afford variety in collections of potted plants.

LAGOECIA, a genus containing a plant of the herbaceous kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferae*.

The characters are: that the calyx is an universal involucre, eight-leaved: leaflets feather-toothed, ciliated, reflex, containing the umbelule: involucre proper four-leaved: leaflets hair-feathered, involving a single footstalk shorter than the leaflet itself: perianthium proper five-leaved, hair many-cleft, superior: the corolla has five two-horned petals, shorter than the calyx: the stamina have five capillary filaments, length of the corolla: anthers roundish: the pistillum is a roundish germ, below the receptacle of the perianthium: style length of stamens: stigmas two, the one truncated: there is no pericarpium: the seeds solitary, ovate-oblong, crowned by the perianthium.

The species is *L. cuminoides*, Wild or Bastard Cumin.

It is an annual plant, about a foot high: the leaves resemble those of Honeywort: the flowers are collected into spherical heads at the extremity of the stalks, and are of a greenish yellow colour: the fruit is small, pedicelled, ovate-acuminate, crowned with a ciliate calyx, villose, one seed only ripening, the other abortive, and fixed laterally to the apex of the other, like a withered scalelet: the fertile seed is of a dusky black colour, sprinkled all over with hoary villose hairs, convex on one side, with five capillary raised whitish streaks, flattish on the other, with three very slender streaks, marking out the place of the abortive seed, which is constantly and easily found when the fruit is well softened in water. It is a native of the Levant, flowering in June and July.

Culture.—These plants may be increased by sowing the seeds in autumn, on a warm border, soon after they are ripe, or where they are to remain; or when permitted to scatter, they come up and form good plants. They afterwards require only to be kept clean from weeds, and in the former cases planted out, when of sufficient growth, where they are to grow.

They afford ornament and variety in the borders and other parts of shrubberies.

LAMB'S LETTUCE. See VALER NA.

LANTANA, a genus containing plants of the shrubby, exotic, green-house, and stove kinds.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatae*.

The characters are: that the calyx is a one-leaved perianthium, very short, converging, obscurely four-toothed, tubular: the corolla one-petalled, nearly equal: tube cylindric, slender, longer than the calyx, rather oblique: border flat, unequally four-cleft, obtuse: the stamina have four filaments, very small, placed in the midst of the tube of the corolla, very slender, of which two are a little higher: anthers roundish: the pistillum is a roundish germ: style filiform, short: stigma refracted, sharp downwards like a hook, and as it were obliquely growing to the tip of the style: the pericarpium is a roundish, one-celled drupe: the seed a round-pyramidal, three-celled nut: the lowest cell sterile: the kernels solitary, oblong.

The species cultivated are: 1. *L. mista*, Various-flowered Lantana; 2. *L. Camara*, Various-coloured Lantana; 3. *L. involucrata*, Round-leaved Lantana; 4. *L. melissifolia*, Baum-leaved Lantana; 5. *L. aculeata*, Prickly Lantana; 6. *L. aurea*, Golden-flowered Lantana.

The first is about five feet in height: the trunk round or roundish, with an ash-coloured bark: the branches at top, several, short, ash-coloured, and from these several others, a long span or a foot in length, quadrangular, green, hairy: the leaves above bright green and somewhat shining, beneath paler, deeply notched, much wrinkled, and very rugged: whilst the flower is yet closed, the lower part of the border appears of a pale red; when it opens, the tube and upper part of the border are saffron-coloured, but become reddish, and finally dark red: this change of colour begins from the circumference and finishes in the centre: hence the flowers in an umbel not being all opened at once, the middle appears of a saffron yellow, and the circumference of a red colour, whence the name. It is a native of America.

The second species has a shrubby stem, a fathom in height, angular, somewhat rugged: the branches subdivided, almost upright, rugged, quadrangular: the branchlets quadrangular, grooved, strict, hirsute, dark green: the leaves on long petioles, decussated, spreading, ovate, acuminate, serrate, nerved, hirsute: the flowers terminating: the peduncles shorter than the leaves, solitary, angular, grooved, hirsute: the bractes broad-lanceolate, concave, entire, pubescent. It is a native of the West Indies, flowering from April to September.

The third has a round woody stem, branched, scarcely hairy: the branches opposite: the leaves petioled, scarcely crenate, membranaceous,

ecous, rigid, less wrinkled than in the others above, nerved beneath, tomentose: the leaves seldom if ever in threes: the peduncles short: the spikes rounded: the bractes large, sessile, cordate-ovate, with six or more nerves running in right lines from the centre, all a little excavated their whole length, and tomentose: the flowers whitish, with pale flesh-coloured margins. It is a native of the West Indies, flowering from May to July.

The fourth species is lower than most of the others, being seldom more than two feet in height: the stem round, ash-coloured, not hairy: the younger branches have bundles of hairs spreading out at top: the leaves opposite, but sometimes in threes, petioled, cordate-acuminate, more deeply crenate than in the other species, wrinkled, rugged and green on the upper surface; paler and tomentose-hairy underneath: the flowers axillary, with three peduncles, where there are three leaves: the bractes oblong, entire, tomentose-hairy, deciduous, differing in size: the colour of the corolla constant, and always yellow. It is a native of South America.

The fifth has the stem in its native situation ten feet high, an inch and a half thick, square from top to bottom, armed with long, strong, reflex prickles, or rather thorns, for they cannot be torn off without injuring the wood; but in the stove only five or six feet in height: the leaves ovate-oblong or cordate-oblong, wrinkled, rugged, crenate: the peduncles long, with fewer and shorter prickles: the colour of the tube of the corolla pale red: border lemon-coloured, changing into an orange and sometimes a deeper colour: the peduncles are terminated by roundish heads of flowers; those on the outside are first of a bright red or scarlet, and change to a deep purple; those in the centre are of a bright yellow, and change to an orange colour. It is a native of the West Indies, flowering from April to November.

The sixth species has the stem seven feet high, at first obscurely quadrangular, but afterwards round, striated, very thinly beset with prickles, and not hairy: the leaves ovate-oblong or almost elliptic, bluntly notched about the edge, very short stiff hairs at the upper surface, the lower rugged with a harsh down, dark green and shining as if they were varnished: the peduncles short: the bractes deciduous, short: the colour of the flower yellow, becoming golden and then saffron-coloured. It is a native of the Bahama Islands.

Culture.—These plants are capable of being raised by seeds and cuttings of the young branches.

The seeds should be sown in pots of light mould in the early spring, plunging them in a bark hot-bed. When the plants have attained some inches growth, they should be removed into separate pots of a small size, and be replunged in the bark-bed, due shade and air being given. The plants should afterwards, when they have acquired strength, be removed into an airy glass-case, or dry stove, where they may have a large share of air in warm weather, but be protected from the cold. This is necessary for the young plants, which should not the first year be exposed to the open air, but afterwards they may be placed abroad in the warmest part of summer, and in winter be placed upon stands in the dry stove, where they will continue long in flower, and many of the sorts ripen their seeds. In winter they should be sparingly watered, as much moisture rots their roots.

The cuttings should be planted in pots in the spring and summer months, as in July, and be plunged in a moderate hot-bed, due shade being given.

They soon take root, and should afterwards be removed into separate pots filled with light earth, and managed in the same manner as those raised from seed.

They afford ornament and variety among collections of stove and green-house plants.

LARCH TREE. See PINUS.

LARKSPUR. See DELPHINIUM.

LATHYRUS, a genus containing plants of the herbaceous climbing flowery kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianthium, half five-cleft, bell-shaped: divisions lanceolate, sharp: the two upper ones shorter; the lowest longer: the corolla papilionaceous: standard obcordate, very large, reflex on the sides and tip: wings oblong, lunulate, short, obtuse: keel half-orbicular, size of the wings, and wider than the wings, gaping inwards in the middle: the stamina have diadelphous filaments, (single and nine-cleft) rising upwards: anthers roundish: the pistillum is a compressed germ, oblong, linear: style erected upwards, flat, wider above, with sharp tip: stigma, from the middle of the style to the tip villose in front: the pericarpium is a legume, very long, cylindric or compressed, acuminate, one-celled, bivalve: the seeds several, cylindric, globose, or but little cornered.

The species cultivated are: 1. *L. odoratus*, Sweet Lathyrus, or Pea; 2. *L. Tingitamus*, Tangier Lathyrus, or Pea; 3. *L. latifolius*, Broad-leaved Lathyrus, or Everlasting Pea.

Several other species may be cultivated where variety is wanted.

The first is an annual plant, which rises from three to four feet high by means of its long claspers or tendrils: the flower-stalks come out at the joints, are about six inches long, and sustain two large flowers, which have a strong odour, and are succeeded by oblong hairy pods, having four or five roundish seeds in each. It is a native of Sicily.

There are several varieties; as the purple-flowered, the white-flowered, the variegated or painted lady, sweet-scented, and the scarlet.

The second species has the stem four or five feet high: the leaflets veined: the peduncles short, sustaining two large flowers with purple standards, the wings and keel bright red: the legumes long, jointed, containing several seeds.

Martyn observes, the whole plant is very smooth: the stem branched, running out on each side into a slender sharp wing: the petioles angular, ending in bifid, trifid or simple tendrils: the stipules lanceolate, acuminate, produced downwards into an earlet, similar but much smaller: the peduncles sometimes one-flowered. It is a native of Barbary, flowering in June and July; and although it has not the agreeable scent, or variety of colours, or continuance in blow of the Sweet Pea, it is usually sown in gardens with other annual seeds.

The third has a perennial root: the stalks several, thick, climbing by means of tendrils to the height of six or eight feet, or even higher in woods: these die to the ground in autumn, and new ones rise in the spring from the same root: the leaves stiff, marked with three or five strong ribs, rolled in at the edge, blunt at the end, but terminating in a little point or bristle; they are always in pairs, and on a winged petiole; at the base of this are large stipules, shaped somewhat like the head of a halbert: the tendrils multifid or branched: the peduncles eight or nine inches long. Each flower has an awl-shaped bracte at the base of the pedicel: the corolla pale purplish rose-colour: the legumes an inch and half long, and half an inch in breadth. It is a native of many parts of Europe, flowering at the end of June and beginning of July.

It is a showy plant for shrubberies, wilderness quarters, arbours, and trellis-work; but too large and rampant for borders of the common flower-garden.

There are many varieties; as the red-flowered, the purple-flowered, the scarlet-flowered, and the large-flowered.

Culture.—These plants may be readily raised, by sowing the seeds of the different sorts in the

autumn or spring seasons at different times, in patches of six or eight together, in the places where they are to grow. Where the soil is light and dry, the autumn is the best season, as the plants appear more early, but in other cases the spring should be preferred. The plants afterwards only require to be kept clean from weeds, and be properly supported by branchy sticks.

The last sort may likewise be increased by transplanting the roots in the autumn; but the plants in this way are seldom so good as by seeds.

The two first sorts must be sown annually, but the last will remain many years.

It is the practice with the gardeners who raise the first sorts for the London markets, to sow them in the autumn in pots, and secure them from severe weather, by placing them in hot-bed frames; by which means they can bring them much more early to market. They may be continued in flower the whole summer by repeated sowings in the spring. When sown in pots they should be watered frequently.

They are all highly ornamental in the borders, clumps, and other parts of pleasure-grounds, when properly intermixed in their species and different varieties.

LAVANDULA, a genus comprising plants of the shrubby evergreen kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved perianthium, ovate: mouth obscurely toothed, short, permanent, supported by a bracte: the corolla one-petalled, ringent, resupine: tube cylindric, longer than the calyx: border spreading: one lip looking upwards, larger, bifid, spreading: the other lip looking downwards, trifid: divisions all roundish, nearly equal: the stamina have four short filaments, within the tube of the corolla, deflected, of which two are shorter: anthers small: the pistillum is a four-parted germ: style filiform, length of the tube: stigma two-lobed; obtuse, converging: there is no pericarpium: calyx converging with the mouth and guarding the seed: the seeds four, obovate.

The species cultivated are: 1. *L. Spica*, Common Lavender; 2. *L. Stæchas*, French Lavender; 3. *L. dentata*, Tooth-leaved Lavender; 4. *L. multifida*, Canary Lavender.

The first has a perennial, thick, woody root: the stem shrubby, much branched, frequently five or six feet high, four-cornered, acute-angled, tomentose: the leaves numerous, blunt, hoary, the upper ones sessile, the lower petioled: the flowers are produced in terminating spikes from

the young shoots, on long peduncles; the spikes are composed of interrupted whorls in which the flowers are from six to ten, the lower whorls more remote: each flower upright, on a short pedicel: the bractes broad-ovate, awned, acuminate, veined: the common colour of the corolla is blue, but it varies with white flowers: the whole plant is covered with a down composed of forked hairs. It is a native of the South of Europe, flowering here from July to September.

There are varieties with narrow leaves with blue flowers, and with white flowers with broad leaves, and Dwarf Lavender.

This species is the Common Lavender; but the narrow-leaved variety with blue flowers is the sort cultivated for its flowers, for medicinal purposes.

The broad-leaved sort has much shorter and broader leaves, and the branches are shorter, more compact, and fuller of leaves: it continues several years without producing flowers; and when it does, the leaves on the flowering-stalks approach nearer to those of the Common Lavender, but are still broader: the stalks grow taller, the spikes are looser and larger, the flowers smaller, and appear a little later in the season.

The second species has a low, thick, shrubby stalk, about two feet high, sending out woody branches the whole length: the leaves about an inch long, hoary and pointed, of a strong aromatic scent, opposite at each joint, with smaller leaves of the same shape coming out at the same places: the branches are terminated with scaly spikes of purple flowers, four-cornered, and an inch in length; and at the top is a coma or small tuft of purple leaves. When it begins to flower, there are only four flowers in a whorl, but these are afterwards increased by the lateral gems, till it becomes gradually round. The whole plant has a very strong, aromatic, agreeable odour. It is a native of the South of Europe, flowering from May to July.

There are varieties with white flowers; and with purple flowers.

The third species has a woody stalk two or three feet high, with four-cornered branches on every side the whole length: the leaves are opposite about an inch long, and an eighth of an inch broad, indented regularly on both sides almost to the midrib, of a grayish colour, a pleasant aromatic odour, and a biting warm taste: the flowers are produced in scaly spikes at the ends of the branches upon long naked peduncles: the spikes are four-cornered, hairy, and about an inch long, terminated by a few purplish leaves. It is a native of Spain, flowering from June to September.

The fourth is an annual (or rather a biennial)

plant, with an upright branching woolly stalk two feet high: the leaves hoary, opposite, cut into many divisions to the midrib: these segments are again divided on their borders towards the top into three blunt ones, so that they end in many points: the peduncle is continued from the end of the branch, is naked, and about six inches long, quadrangular, and terminated by a close spike of flowers about one inch long: the rows of flowers are twisted spirally. There are commonly two small spikes below this, and about an inch from it: the corolla varies from blue to white. It is a native of Spain.

There is a variety which rises with an upright, branching, square stalk, four feet high: the leaves longer, and cut into narrower segments than the Spanish plant: they are of a lighter green, and almost smooth: the naked flower-stalk is also much longer, and terminated with a cluster of spikes of blue flowers: at two or three inches below these are two small spikes, one on each side: the flowers are smaller than those of the first sort. It is a native of the Canary Islands.

Culture.—All the sorts are readily increased, by planting slips or cuttings of their young shoots in the spring.

In the first two sorts, a quantity of slips or cuttings should be taken off in the early spring, as March or April, from three or four to six inches long, stripping off the underleaves, then planting them in a shady border four inches asunder, giving a good watering, and repeating it occasionally in dry weather. When the plants are well rooted in summer, they should be transplanted into the place where they are to grow, early in autumn, as September or October, with balls of earth about their roots.

When the first sort is intended to produce flowers for economical purposes, it should be planted in rows, two or three feet asunder, and about the same distance in the rows, or in a single row one or two feet asunder, along the edge or divisions of garden-grounds, in a sort of edging or dwarf hedge; in either of which modes the plants grow freely, continuing in root, stem and branches several years, and produce abundance of spikes of flowers annually for gathering in the latter end of summer: the culture afterwards is principally to cut down any remaining decayed flower-stalks in autumn, pruning or cutting away any disorderly out-growing branches at top and sides, and digging the ground occasionally in spring or autumn along the rows of plants.

The second sort may also often be raised from seeds, which should be sown in a bed of light earth in the early spring, and raked in evenly

with a light hand. The plants rise in about a month, when, if there be dry weather, water should be given; and after they are three inches high, they should be pricked out in beds, half a foot apart, watering them as they require, until fresh rooted. They should stand here till the following spring, and then be transplanted out, and planted where they are to remain.

The two first sorts are useful for their fine spikes of flowers, as well as ornaments in assemblage with other shrubby plants, in the borders and clumps of pleasure-grounds; and the two last sorts in green-house collections with other potted plants.

Those designed for shrubberies or other similar places, being previously raised to some tolerable bushy growth, and a foot high or more, should be planted either in the early autumn, or in the spring, disposing them singly at proper distances in the fronts.

The third and fourth sorts may be increased by slips and cuttings, planted in pots in the early spring months, and placed under frames, to shelter and shade from the mid-day sun, till they are rooted; and when a little growth, transplanted into separate pots, and managed as other green-house exotic plants.

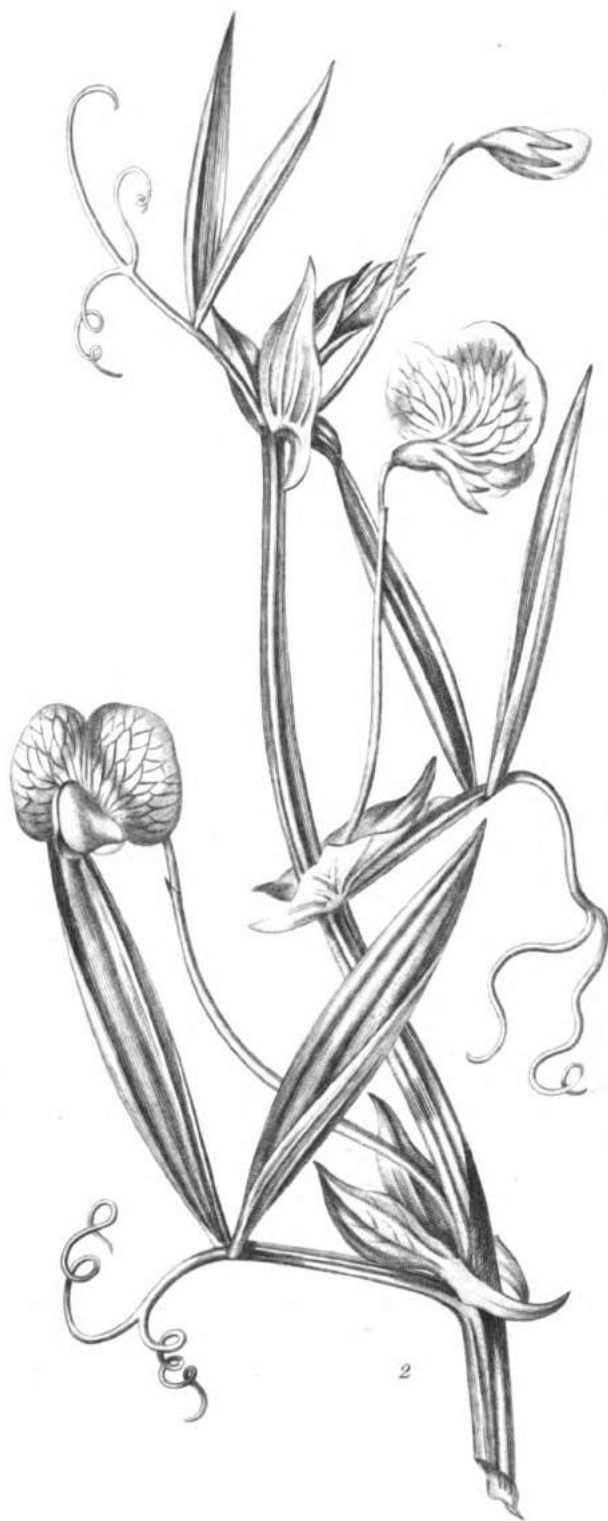
LAVATERA, a genus containing about ten species of the herbaceous shrubby perennial kind.

It belongs to the class and order *Monadelphæa Polyandria*, and ranks in the natural order of *Malvaceæ*.

The characters are: that the calyx is a double perianthium: exterior one-leaved, trifid, obtuse, short, permanent: interior one-leaved, trifid, more acute, more erect, permanent: corolla has five obcordate flat petals, none of which are affixed below to the tube of the corolla: the stamina have numerous anthers, which coalesce below into a tube, the exterior of which is bristly, length of the tube about the length of the anther: the pistillum is an orbicular capsule, as there are stigmas, and a whorl round the capsule, the seeds falling off: the seeds solitary.

The species cultivated are *Malva*, *Cretan Lavatera*; 2. *L. trimesitis*, *Cretan Annual Lavatera*; 3. *L. Thuringiaca*, *Great-flowered Lavatera*; 4. *L. arborea*, *Tree Lavatera*, or *Mallow*; 5. *L. Olbia*, *Downy-leaved Lavatera*; 6. *L. triloba*, *Three-lobed Lavatera*; 7. *L. Lusitanica*, *Portuguese Lavatera*.

The first has an annual fibrous root of thick fibres, a foot in length, with innumerable other capillary fibres: the stem round, rugged, five



Painted by Syd. Edwards

London Published Sep. 1858 by G. Kearsey Fleet Street

Engraved by F. Sanford

Lavatera Trimestris
1 Annual Lavatera

Lathyrus Sativus
2 Blue flowered Lathyrus

feet high, branched: the leaves on long petioles, very soft, tomentose, toothed, seven-angled, the angles of the upper ones sharper: the stipules lanceolate, ciliate, bowing at bottom and then erect: the flowers axillary, about four together, on upright peduncles: the outer calyx cup-shaped, with ovate segments: inner a little longer, five-cornered above, with lanceolate segments: the corolla twice the length of the calyx, pale blue, with oblong, emarginate petals: the germ orbicular-flattened, ten-grooved: the stigmas ten: the fruit smooth, within the calyx: the capsules ten, round a column terminated by a hemisphere with a very small point at top, disappearing when the fruit is ripe, and leaving a hole in the middle of the capsules, which then turn black. It is a native of the island of Candia or Crete, flowering in July.

It varies with red flowers, with white flowers, and with purple flowers.

The second has also an annual root, white, with spreading beards: the stem round, two feet high, branched, the lower branches almost horizontal: the leaves crenate-toothed, smooth, on long petioles, gradually narrowed towards the tip: stipules ovate-lanceolate, ciliate, bowed at bottom and then straight: the flowers solitary, axillary, on peduncles shorter than the petiole: outer calyx semi-trifid, with keeled segments; inner larger, with lanceolate segments, curled at the edge: the corolla large, spreading, bell-shaped, pale flesh colour, with whitish lines: petals broader above, crenate, frequently rolled up, the edges of the claws deep purple: the germ very smooth: the style multilid: the stigmas pale-flesh-coloured, longer than the tube, thirteen to eighteen: the fruit hemispherical, convex beneath, covered at top with a circular, concave, smooth lid or peltate umbrella: there are about twenty capsules in a whorl; they are brown, closed all round and not opening, with a longitudinal raised line along the back, elegantly marked on the sides with flexuose streaks drawn from the circumference to the centre: the seeds are ferruginous. It is a native of the South of Europe, &c. flowering from July to September.

There are several varieties.

The third has the stem five or six feet high, woolly, branched: the lower leaves heart-shaped, crenate, roundish-lobed: upper hastate, on short petioles: the stipules lanceolate: the flowers axillary, solitary, peduncled; peduncles longer than the leaf: the calyxes subtomentose: the segments of the outer heart-shaped, with a very sharp point; of the inner oblong acute: the corolla large, spreading, pale violet or purplish, shaped like those of the Marsh-mallow, but larger: petals emarginate: the capsules

about twenty (fourteen) in a wing of a papery substance, somewhat rugged, about a columnar receptacle, which has many wings from the permanent sides of the capsules, like the cogs of a mill wheel, ending in a conical awl-shaped point: the seeds flattened a little, smooth, subcinereous or brown. It is a native of Sweden, flowering from July to September.

The fourth species rises with a strong thick stalk the height of eight or ten feet (in gardens), dividing into many branches at the top: in its wild state, when largest, from four to six feet high, and as much as four inches in diameter: the leaves are alternate, numerous, cordate, roundish-seven-angled (some five- and others three-angled), the angles blunt, soft as velvet, shorter than the petioles: the stipules short, smooth, acuminate at the tip, broad at the base: the flowers mostly in pairs, sometimes three together, on upright peduncles an inch and a half in length: the outer calyx ovate at the base, divided half way into three broad blunt segments; inner only half the size, divided half way into five sharp segments: the corolla purplish red, with dark blotches at the base, spreading bell-shaped (like that of the common Mallow), an inch or more in diameter: the petals broader at top, narrow at the base, so that the calyx appears between the claws: the cylinder of filaments purple, woolly at the base: the germ very smooth: the style usually eight-cleft at top: the stigmas revolute, reddish: the ring or whorl of fruits is seven- or eight-capuled: the common receptacle awl-shaped, with a conoid globe at top, and small crescent-shaped lamellæ at the base and the interstices of the capsules: the capsules are reniform-rounded, sharply three-cornered, membranaceous, wrinkled, closed on all sides, pale bay-coloured, not opening: the seeds kidney-shaped, and ash-coloured. It is a native of Italy, &c. flowering from June or July to September or October.

The fifth has a round branched stem, five feet high, villose at top, reddish: the leaves soft, whitish, tomentose, unequally serrate; the lower subcordate-hastate, five-angled; the upper ovate, three-cusped, the middle lobe narrowed, acute, oblong: the stipules ovate-lanceolate, villose: the flowers on short peduncles, axillary, solitary, very seldom two together; terminating ones in a spike: the outer calyx ovate, with roundish-acute segments; inner larger, with lanceolate-acute segments: the corolla large, spreading very much, reddish-purple: the petals with narrowed claws, covered with white hairs, inserted into a flesh-coloured tube: the stamens purple: the germ roundish-compressed, with twenty grooves: the style divided into about twenty

parts: the stigmas long, recurved: the capsules about twenty, black, smooth, fixed in a ring about a thick striated cone: when the seeds are ripe, that part which is next to the axis appears naked, on account of the pellicle which forms the internal part of the capsule adhering to the axis. According to Linnaeus, the leaves of the first year are very large, and those of the following much smaller, which is a circumstance common to this with other plants of the same natural order. It is a native of the South of France, flowering from June to October.

The sixth species has a round branched stem, from three to four feet in height: the leaves are alternate, petioled, shorter than the petioles, roundish, but with the border so rolled back as to appear triangular: the stipules cordate, broad, acuminate, serrate: the flowers axillary: three peduncles, mostly one-flowered, in each axil, upright, shorter than the petiole: the segments of the outer calyx broad-cordate, acuminate: the inner calyx twice as large, five-cornered, acuminate, with the corners prominent: corolla large, spreading, pale purple, with the claws white, hairy: the capsules about fifteen, in a ring about a column ending in a point. According to Linnaeus, the whole plant is tomentose, being covered with very small glutinous hairs, with other larger ones stellate at top mixed among them. It is a native of France and Spain, flowering from June to September.

The seventh is a native of Portugal, flowering in August and September.

Culture.—The first two, or annual sorts, are readily increased, by sowing the seeds in a light soil in the places where the plants are to remain, or in pots, in the spring season, as about the latter end of March, in patches of four or five in each, giving them water occasionally when the weather is dry. When the plants have attained a little growth, they should be thinned out to one or two of the strongest plants. When any are to be removed to other places, it should be done at this period, and with a little earth about the roots, due water and shade being given; but they seldom succeed well by transplanting.

All the other shrubby perennial sorts may likewise be increased by sowing the seeds, and managing the plants in the same manner.

Most of these sorts will not last more than two years in this climate, unless the soil be dry, when they continue three or four.

They in general require a warm dry situation, or to have their roots covered by old tan, or the protection of the green-house during the severity of the winter season.

They are all highly ornamental in different

parts of pleasure-grounds. The annual sorts have great beauty, in their flowers being large, numerous, and conspicuous, and are proper where large showy-flowering plants are required. The perennial kinds are also suitable for large borders and shrubby compartments, having large, straight, upright, durable stems, terminated by branchy bushy heads, and very large soft foliage, that form a fine variety in assemblage with other plants, though their flowers are often hidden by their large leaves.

LAVENDER. See LAVANDULA.

LAVENDER COTTON. See SANTOLINA.

LAUREL. See LAURUS and PRUNUS.

LAUREL SPURGE. See DAPHNE.

LAUREOLA. See CESTRUM and DAPHNE.

LAURESTINE. See VIBURNUM TINUS.

LAUROCERASUS. See PRUNUS.

LAURUS, a genus containing plants of the evergreen and deciduous tree kinds for the borders, green-house, and stove.

It belongs to the class and order *Enneandria Monogynia*, and ranks in the natural order of *Holoraceae*.

The characters are: that there is no calyx (unless the corolla be so called): the corolla has six ovate acuminate petals, concave, erect: the alternate ones exterior: nectary consisting of three acuminated coloured tubercles, ending in two bristles, standing round the germ: the stamina have nine filaments, shorter than the corolla, compressed, obtuse, three in each rank: anthers growing on each side to the margin of the filament on the upper part: glandules two, globose, with a very short footstalk, affixed to each filament of the inner rank near the base: the pistillum is a subovate germ: the style simple, equal, length of the stamens: stigma obtuse, oblique: the pericarpium is a drupe (or berry), oval, acuminate, one-celled, comprehended by the corolla: the seed is an ovate-acuminate nut: the kernel of the same form.

The species cultivated are: 1. *L. nobilis*, Common Sweet Bay; 2. *L. æstivalis*, Willow-leaved Bay; 3. *L. Benzoin*, Common Benjamin-tree; 4. *L. Sassafras*, Sassafras-tree; 5. *L. Indica*, Royal Bay, or Indian Laurel; 6. *L. Borbonia*, Broad-leaved Carolina Bay, or Red Bay; 7. *L. Camphora*, Camphor, or Gamphire-tree; 8. *L. Cinnamomum*, Cinnamon-tree; 9. *L. Cassia*, Cassia, or Wild Cinnamon-tree; 10. *L. Persea*, Alligator Pear.

The first in this climate appears as a shrub, but in the southern parts of Europe it becomes a tree of twenty or thirty feet in height; much subject, however, in general, to put out suckers: the leaves are evergreen, of a firm texture, the largest from an inch and a half to two inches in

breadth in the broad-leaved variety, and from three to four inches in length, entire, on short petioles, having an agreeable smell, and an aromatic, subacid, bitterish taste: the flowers are dioecious, or male and female on different trees, in racemes shorter than the leaves, of an herbaceous colour: the corollas four-petalled in the male flowers, with from eight to twelve stamens: the berry superior, ovate, fleshy, dark purple almost black: the receptacle none, except a small tubercle at the bottom, whence a vascular band rises on each side the whole length of the seed; which is large, ovate, slightly mucronate above. It is a native of the southern parts of Europe, and of Asia.

There are several varieties; as the broad-leaved, which is almost too tender for the open air in this climate, with leaves much broader and smoother than those of the common sort;—the common, which is seldom hurt in this climate, except in very severe winters, of which there are two subvarieties, one with plain leaves, the other with leaves waved on the edges;—the narrow-leaved, with very long narrow leaves, not so thick as those of the preceding two sorts, and of a light green, the branches covered with a purplish bark, and the male flowers come out in small clusters from the axils of the leaves, sitting close to the branches; of which there are subvarieties in the nurseries with variegated leaves.

What is now called Bay was formerly called Laurel, which has introduced some confusion.

The second species rises with a shrubby branching stalk eight or ten feet high, covered with a purple bark: the leaves are opposite, near two inches long and one inch broad, smooth on their upper side, but veined on their under, where they are rough: the berries red, nearly the size and shape of the common Bay-berry. It is a native of North America.

The third rises to the height of ten or twelve feet, dividing into many branches: the leaves are near three inches long, and an inch and a half broad, smooth on their upper surface, but with many transverse veins on their under side: the flowers of a white herbaceous colour, with six stamina in each: the involucre is sessile, four-leaved, much resembling that of *Cornus*, including five petioled florets, the length of the involucre: proper calyx (or corolla) six-parted, yellow, with linear segments: the stamens eight or nine, the length of the calyx, appendicled on the sides: the germ ovate, within the calyx: the style simple. It is a native of Virginia.

Martyn observes that it has been confounded with the true Benzoin tree. See *STRYAX BENZOIN*.

The fourth species is commonly a shrub, seldom rising more than eight or ten feet high (it sometimes, however, grows into a large tree): the leaves are of different shapes and sizes; some oval and entire, about four inches long and three broad; others are deeply divided into three lobes; these are six inches long, and as much in breadth from the extremity of the two outside lobes; they are placed alternately on pretty long footstalks, and are of a lucid green; they fall off early in the autumn; and in the spring, soon after the leaves begin to come out, the flowers appear just below them, on slender peduncles, each sustaining three or four small, yellow (greenish white) flowers, which have five oval concave petals, and eight stamina in the male flowers, which are upon different plants from the hermaphrodite flowers: these are succeeded by an oval berry, which, when ripe, is blue. It is a native of America. Its wood is of a light and spongy texture, having a fragrant smell, and a sweetish aromatic taste.

The fifth is a large tree with ascending branches: the branches, and particularly the shoots, are tubercled with scars from the fallen leaves; they are alternate, curved inwards, wrinkled and smooth: the leaves scattered, acuminate with a bluntish point, quite entire, smooth, veined, reflex, four inches long: the petioles semi-cylindric, grooved, smooth, reflex: the flowers terminating, below racemed, above panicled: the panicle trifid: ovate, red nectareous scales at the base of the filaments, which vary in number from seven to nine; six outer, and one, two, or three inner: they are unequal, flat, and nearly equal to the calyx: the anthers compressed, four-celled: the germ roundish: the style very short: the berry globular, small, and brown. It is a native of Madeira.

The sixth species rises with a straight large trunk to a considerable height near the sea; but in the inland parts of the country it is of hamble stature: the leaves are much longer than those of the Common Bay, and are a little woolly on their under side; their edges are a little reflexed; the veins run transversely from the midrib to the sides: the male flowers come out in long bunches from the axils of the leaves: the female flowers in loose bunches on pretty long red peduncles: the berries are blue, in red cups, growing two and sometimes three together. It is a native of America.

The seventh species is very near akin to the ninth, from which it differs in the leaves, those of the latter having three ribs running longitudinally from the foot-stalk to the point, where they soon diminish; whereas in this the

ribs are small and extend towards the sides; their surface is smooth and shining: they are male and hermaphrodite in different trees: it is a large tree, with ascending branches: the leaves quite entire, smooth, mostly alternate, but some opposite, petioled, whitish underneath: the flowers white, on simple, long, lateral peduncles: the berry small, ovate, dusky or brownish red. It is a native of China, &c. Its wood is in much esteem for carpenters' purposes, being easily wrought, light, durable, and not liable to be injured by insects, particularly the *coombang*, a species of bee, which, from its faculty of boring timber for its nest, is called the *Carpenter*.

The chief of the Camphor used in Europe is prepared from this tree in Japan, by splitting the wood into small pieces, and subliming or distilling it with water in an iron retort, covered with an earthen or wooden head, in the hollow of which they fasten hay or straw, to which the Camphor, as it rises, adheres. This Camphor is brownish or white, but in very small semipellucid grains. It is packed up in wooden casks, and thus sent to India and Europe, where it is purified by a second sublimation, and reduced into the solid mass as found in the shops. Native Camphor, or the *Capoor Barroos* of the Malays, is a production obtained in Sumatra and Borneo by cutting down the trees, and splitting them with wedges into small pieces, the Camphor being found in the interstices in the state of a concrete crystallization. Some have asserted that it is from the old trees alone that this substance is procured, and that in the young trees it is in a fluid state, called *meenio capoor* or Camphor oil; but this is a mistake: the same sort of tree that produces the fluid does not produce the dry, transparent flaky substance, nor ever would. They are readily distinguished by the natives. Many of the trees, however, produce neither the one nor the other. The traders usually distinguish three degrees of quality, by the names of *head*, *belly*, and *foot*, according to its purity and whiteness. Some add a fourth sort, of extraordinary fineness, of which a few pounds only are imported to Canton, and sell there at the rate of two thousand dollars the *pecul*.

The Common Camphor will evaporate till it wholly disappears; while that of Sumatra and Borneo, called *Native Camphor*, though subject to some decrease, does not appear to lose much in quantity from being kept.

Camphor oil is obtained by the Sumatrans by making a transverse incision into the tree, to the depth of some inches, and then cutting slopingly downwards from above the notch, till a

flat horizontal surface be left. This they hollow out, till it is of a capacity to receive a quart: then put into the hollow a bit of lighted reed, and let it remain for about ten minutes, which acting as a stimulus, draws the fluid to that part. In the space of a night the liquor fills the receptacle previously made. The trees are soon exhausted.

The eighth in its native situation is a tree twenty feet high or more, the trunk about six feet high, a foot and a half in diameter, the outer bark smoothish, and of a dusky cinereous colour; it has spreading branches that form an elegant head; but in our stoves it is only of low growth: the leaves are opposite or nearly so, ovate-oblong, oblong-acuminate, or subovate, bluntly acuminate, quite entire, shining, coriaceous, on short petioles, from three to five inches long; the three nerves spring from the petiole, and either immediately recede from each other, or continue united for a line or two and then diverge; they are of a bright green on the upper surface, but pale on the under, with the nerves whitish. On the younger branches or twigs arise slender common peduncles, from opposite axils, the terminating ones an inch, the others two or three inches long, three-flowered at top, or else trifid, with each division three-flowered: the flowers small, greenish yellow, almost insipid, with a somewhat foetid smell: the fruit the form and size of a middling Olive, insipid, deep blue and soft, inclosing a thin, pale-coloured nut with a white kernel, which germinates soon after it falls, and therefore cannot easily be transported to a distance: the inner bark perfectly resembles the Oriental Cinnamon in smell, taste, and figure; the only difference is, that it has a coarser texture, and a more acrid taste, which may arise from the climate. It is a native of Martinico and Brazil, flowering in February and March.

There are several varieties; but it is the Ceylon Cinnamon that is chiefly used as a spice.

The ninth is supposed, according to Martyn, not to be a distinct species from the true Cinnamon. The difference of the bark may, he supposes, be owing to soil or situation, but more probably to want of skill or attention in the cultivators. The Cassia bark is coarser, and will not roll up like true Cinnamon; but the essential difference between the bark of Cinnamon and Cassia is, that the former is always dry, whereas the latter becomes mucilaginous in chewing; hence it has been suggested here, as a conjecture on the most respectable authority, that the superior excellence of Cinnamon bark may be in a great measure owing to its having been deprived of that mucilage which adheres to its interior surface.

Marsden asserts that the Cassia tree grows from fifty to sixty feet high, with large spreading horizontal branches, almost as low as the earth: the leaves are about four inches long, narrower than those of the Bay, and more pointed, deep green, with a smooth surface and plain edge: the principal fibres or nerves take their rise from the peduncle: the young leaves are mostly of a reddish hue: the blossoms grow six in number upon slender footstalks, close to the bottom of the leaf: they are monopetalous, small, white, and stellated in six points: the stamina are six (nine), with one style growing from the germ, which stands up in three brownish segments resembling a cup. It is a native of Malabar.

The bark is commonly taken from such trees as are a foot or eighteen inches in diameter, as when they are younger, it is said to be so thin as to lose all its qualities very soon. Those trees which grow in a high rocky soil have red shoots, and the bark is superior to that which is produced in a moist clay where the shoots are green. Marsden has been assured by a person of extensive knowledge, that the Cassia produced in Sumatra is from the same tree that yields the true Cinnamon, and that the apparent difference arises from the less judicious manner of quilling it. Perhaps the younger and more tender branches should be preferred; perhaps the age of the tree, or the season of the year, ought to be more nicely attended to; and it is suggested, that the mucilage which adheres to the inside of the fresh-peeled rind, when not carefully wiped off, injures the flavour of the Cassia, and renders it inferior to that of the Cinnamon.

The tenth species grows to the height of thirty feet or more in the West Indies, and has a trunk as large as common Apple-trees: the bark is smooth, and of an ash colour: the branches are beset with pretty large, oblong, smooth leaves, like those of Laurel, of a deep green colour, are succulent, and soft. The flowers are for the most part produced towards the extremities of the branches: the fruit is the size of one of our biggest pears, inclosing a large seed with two lobes, included in a thin shell. It is held in great esteem in the West Indies: the pulp is of a pretty firm consistence, and has a delicate rich flavour; it gains upon the palate of most persons, and becomes soon agreeable even to those who cannot like it at first; but it is so rich and mild, that most people make use of some spice or pungent substance to give it a piquancy; and for this purpose, some make use of wine, some of sugar, some of lime-juice, but most of pepper and salt. It is a native of the West Indies.

VOL. II.

Culture.—The first sort may be increased by seed, layers, and suckers.

The seed should be sown soon after the berries are ripe, or early in spring, either in beds, covering them with earth near an inch deep, or in drills half a foot asunder, the same depth: when the plants are come up, they should be supplied with frequent waterings during summer, and in winter defended from severe frost by the shelter of mats, or some other covering, being tender while young; and after having two summers' growth in the seed-bed, in the spring following the strongest should be removed into nursery rows, one or two feet asunder, and a foot apart in each row, giving water in dry weather, till they have taken good root, and keeping them clear from weeds. When they are half a yard, or two or three feet high, they are of proper growth for transplanting into the shrubbery in autumn or spring.

The berries may also be sown in pots, and plunged in a hot-bed in spring, which brings the plants forwarder, being careful to inure them to the full air in the summer season.

Some of the lower branches that are well furnished with young shoots may be laid down in the early spring, or in August, but the latter is the better season; each shoot being slit-layed: they become rooted in one year, when in spring they may be taken off, and planted in the nursery, as directed for the seedlings.

The suckers should be taken up with good roots in autumn or spring, and be planted in the nursery like the seedlings and layers.

It is also capable of growing by cuttings, planted in the beginning of April on a moderate hot-bed of tanners' bark covered eight inches deep with rich loose fresh earth, five inches deep, and eight or nine asunder, rubbing off their leaves, and watering them gently every evening while the bed continues warm, covering the glasses with mats during the heat of the day. When the cuttings have shot roots, they should receive all mild gentle showers, and the evening dews. In the beginning of August, the glasses may be taken off, being replaced when the weather begins to be frosty; keeping them open every mild day. In the beginning of the April following, or as soon as the weather becomes temperate, both glasses and frames should be removed, continuing frequent and plentiful waterings during the summer months, as the weather may require; and in the succeeding April the plants will be strong, well rooted, and fit for planting out.

When the plants raised in these ways are removed to the nursery, they should have their

H

superfluous roots and branches cut away, encouraging the leading shoots; planting them in a well-sheltered quarter of light mould. The ground should be dug over in autumn and spring, keeping it clean, loose, and mellow in summer, and the plants be annually pruned in April.

The gold-striped variety is tender, being commonly kept in pots, and housed with hardy green-house plants. When it stands in the open ground, it is sometimes much injured in severe winters. The method of increasing it is by budding it on the plain sort.

The broad-leaved and narrow-leaved varieties are not so hardy as the common sort, being scarcely able to live abroad whilst young, in common winters, without shelter. As in severe winters the old trees are frequently killed, or at least the branches much injured, the plants are frequently kept in tubs, and housed in winter.

The second, third, and fourth sorts may be increased by seed, by layers, and sometimes by suckers and cuttings. The seeds or berries procured from America, and preserved in sand, should be sown as soon after they arrive as possible, in a bed of light earth an inch deep, or in largish pots the same depth, plunging them in mould, in an eastern border, up to their rims, till the spring following; when they should be placed in a hot-bed, which greatly forwards the germination of the seed, and soon brings up the plants. They must be timely inured to the full air. The plants raised by either method should, while young, be watered during summer, and sheltered from frost in winter, and when two years old be planted out in nursery rows, as directed for the other plants. They may also be increased by layers and suckers in the same manner as directed for the first sort; but it is sometimes long before the layers are rooted.

They are likewise sometimes capable of being increased by cuttings, by the aid of a good hot-bed.

The fifth, sixth, and seventh sorts may be increased by layers, but they are sometimes two years before they are sufficiently rooted. They may also be raised from seeds, procured from the places of their natural growth, sowing them in pots, and plunging them in a hot- or bark-bed; but without this aid they do not always grow freely the first season; in which case they should be placed in the open air in summer, and in a frame or in the green-house, near the windows, in winter; and in spring the pots be plunged in a hot-bed, which will bring up the plants, giving air daily, and frequent waterings, and inuring them by degrees to the open air as the summer advances; placing them in shelter

in winter, and in the following spring planting them out in separate small pots, managing them as other green-house shrubs.

The eighth, ninth, and tenth sorts are also raised by layers and seed, sown and managed as above, generally assisted by the bark-bed of the stove; the plants being planted off into separate pots, and managed afterwards as other hot-house plants.

The first, second, third, and fourth sorts are highly ornamental in the borders and clumps in pleasure-grounds; the three following in green-house collections; and the three last among other stove plants.

LAWN, an open space of short grass-ground, in the front of a residence, or in a garden, park, or other pleasure-ground.

Lawns extended in the principal fronts of habitations, add considerably to the neatness and grandeur of their appearance, by laying them open, and admitting more extensive prospects. Where there is a sufficient scope of ground, they should be as large as the nature of the situation will admit, always being planned in the most conspicuous parts immediately adjoining the houses, and extended outward as far as convenient, allowing width in proportion; having each side or verge bounded by elegant shrubbery compartments in a varied order, separated in some parts by intervening spaces of grass-ground, of varied dimensions, and serpentine gravel-walks, gently winding between and through the plantations, for occasional shady, sheltered, and private walking; or similar walks carried along the fronts of the boundary plantations, and immediately adjoining the Lawns, for more open and airy walking in; and in some concave sweeps of the plantations there may be recesses and open spaces both of grass and gravel, of different forms and dimensions, made as places of retirement, shade, &c.

The usual situations of Lawns are those just mentioned; but if the nature of the ground admit, or in cases where there is good scope of ground, they may be continued more or less each way; but always the most considerably on the principal fronts, which if they be to the south, or any of the southerly points, they are the most desirable for the purpose.

The dimensions may be from a quarter of an acre or less, to six or eight acres or more, according to the extent and situation of the ground. Sometimes Lawns are extended over ha-has, to ten, twenty, or even to fifty or sixty acres or more.

The form must be directed by the nature of the situation; but it is commonly oblong, square, oval, or circular. But in whatever figure they

are designed, they should widen gradually from the house outward to the furthest extremity, to have the greater advantage of prospect; and by having that part of them within the limits of the pleasure-ground, bounded on each side by plantations of ornamental trees and shrubs, they may be continued gradually near towards each wing of the habitation, in order to be sooner in the walks of the plantations, under shade, shelter, and retirement. The terminations at the further ends may be either by ha-has to extend the prospect, or by a shrubbery, or plantation of stately trees, arranged in sweeps and concave curves. But where they extend towards any great road, or distant agreeable prospect, it is more in character to have the utmost verge open, so as to admit of a grand view from and to the main residence.

The side-boundary verges should have the plantations rurally formed, airy, and elegant, by being planted with different sorts of the most ornamental trees and shrubs, not in one continued close plantation, but in distinct separated compartments and clumps, varied larger or smaller, and differently formed, in a somewhat natural imitation, being sometimes separated and detached less or more, by intervening breaks and open spaces of short grass, communicating both with the Lawns and interior districts; and generally varied in moderate sweeps and curves, especially towards the Lawns, to avoid stiff, formal appearances, both in the figure of the Lawns and plantations. In planting the trees and shrubs, which should be both of the deciduous and evergreen kinds, where intended to plant in distinct clumps, either introduce the deciduous and evergreens alternately in separate parts, or have some of both interspersed in assemblage; in either method placing the lower growth of shrubs towards the front, and the taller backwards in proportion to their several statures, so as to exhibit a regular gradation of height, that the different sorts may appear conspicuous from the main Lawns. They may be continued backwards to a considerable depth, being backed with trees and shrubs of more lofty growth. The internal parts of the plantations may have gravel or sand walks, some shady, others open; with here and there some spacious short grass openings of different dimensions and forms.

Extensive Lawns in parks or paddocks, &c. have seldom any boundary plantations close to what may be considered as a continuation of them beyond the pleasure-ground, but are sometimes dotted with noble trees, dispersed in various parts, at great distances, so as not to obstruct the view; some placed singly, others in groups by twos, threes, fives, &c. and some placed irregularly, in triangles, sweeps, straight lines,

and other different figures, to cause the greater variety and effect, each group being diversified with different sorts of trees, all suffered to take their natural growth.

These kind of spaces or openings should always be kept perfectly neat, by being often mowed, rolled, and mown. See GRASS-GROUND, and TURFING.

LAWSONIA, a genus containing plants of the exotic tree kind for the stove.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Salicarieæ*.

The characters are: that the calyx is a four-cleft perianthium, small, permanent: the corolla has four petals, ovate-lanceolate, flat, spreading: the stamina have eight filiform filaments, length of the corolla, in twin pairs between the petals: anthers roundish: the pistillum is a roundish germ: style simple, length of the stamens, permanent: stigma headed: the pericarpium is a capsule (or berry), globose with a point, four-celled: the seeds many, cornered and pointed.

The species are: 1. *L. inermis*, Smooth Lawsonia; 2. *L. spinosa*, Prickly Lawsonia.

The first rises with a shrubby stalk eight or ten feet high: the branches come out by pairs opposite; they are slender and covered with a whitish yellow bark: the leaves are small, opposite, oblong, ending in acute points, pale green: the flowers in loose terminating bunches, gray or dirty white: the petals small, turning back at the top. It is a native of India, &c.

The second species rises with a woody trunk eighteen feet high or more: the wood is hard and close, covered with a light gray bark: the branches alternate: the leaves oblong-oval: at the joints where the leaves are placed come out single, strong, sharp thorns: the flowers are in loose bunches from the sides of the branches, pale yellow, of a disagreeable scent. It is a native of the East Indies.

Culture.—These plants may be raised by sowing the seeds in pots of light mould in the early spring, plunging them in the bark-bed of the stove. When the plants have acquired a few inches growth, they should be removed into separate small pots filled with light sandy earth, replunging them in the bark-bed, and giving a little water, with proper shade. They afterwards may be placed so as to have pretty free air, but be constantly kept in the stove.

They afford variety among other stove plants.

LAYER, the young shoot or branch of such trees as are capable of being raised by being laid into the ground. It is the part which is placed in the earth in order to strike root.

LAYING, the operation of placing layers in the soil. It is a method adapted to most sorts

of trees and shrubs, and many herbaceous plants. It is effected by laying branches and young shoots of trees and plants in the earth, from two or three to five or six inches deep, leaving their tops out, that the part layed in the earth may emit roots, and become a plant. The layers, when rooted, should be separated from the parent, and planted in the nursery, or other proper place, to acquire due strength and size, for the purposes for which they are designed.

They require different lengths of time for becoming rooted, from a few months to two or more years.

Numbers of shrubs and trees are increased by layers, but the practice is more particularly applicable to the shrub kind; as their branches grow near the ground, convenient for being laid down. It may, however, be practised with success on fruit-trees and forest-trees, when their branches are situated low enough for being laid, though the varieties of many fruit-trees are better propagated by grafting and inoculation. The vine and fig, however, often admit of being increased by layers; and forest-trees, for the continuance of varieties; as the plants raised in this method continue exactly the same as the parent plant from whence they were raised. This is a certain method to continue any approved variety, as well as to increase such shrubs or trees as do not produce seeds here, and which cannot be easily obtained. It is likewise an expeditious and easy mode of propagation; as by it many new plants are often raised in a few months, which would take two or three years to bring them to the same size from seed. In many sorts it is so easy that all the shoots of any branch situated near the ground, or convenient for laying down, may be made distinct plants.

For all sorts of the tree or shrub kinds, it is generally performed on the young shoots of the preceding summer, which should be laid down in spring or autumn; but sometimes on shoots of the same year, in summer, especially in the hard-wooded evergreen trees and shrubs, that do not strike root readily in the older wood. Many sorts of trees that have their wood of a soft loose texture often grow pretty freely by Layers of them, of two or several years growth.

In herbaceous plants capable of being propagated by layers, such as carnations, pinks, double sweet-williams, &c. the young shoots of the same year, laid down in June and July, are commonly the most successful.

The season for performing this sort of work, in most sorts of trees and shrubs, is autumn and spring, though it may be performed at almost any time of the year.

Many kinds of under-shrubby and herba-

ceous plants also succeed, if layed any time in spring or summer till the end of June; though that and the following month are the most successful for the herbaceous tribe, as carnations and others usually propagated by laying, as they then root the same season in from three or four to five or six weeks, so as to be proper for transplanting.

When it is intended to lay trees or shrubs that naturally run up to stems, without furnishing any considerable quantity of lower branches for laying, a sufficient number of strong plants should be set in the nursery, at proper distances, and headed down in the autumn or spring after, within a few inches of the ground, that they may throw out a good quantity of young shoots the following summer, near the earth, so as to be convenient for laying down in the succeeding autumn; or, by waiting another year many more shoots for the purpose of layers will be provided, by the first shoots throwing out many lateral ones, each of which when layed will form a plant. And on the layers being rooted, and all cleared away, the stool remaining will furnish another crop of shoots for laying next year, and the same in succession for many years.

When layers are wanted from trees that are grown up, and whose branches are at a distance from the ground, a temporary stage or scaffold is erected, on which pots or tubs of mould are placed to receive the layers.

The general method of merely laying the branches or shoots in the earth, is practised for all sorts; but previous to laying, they are often prepared in different ways to facilitate their rooting, according as the trees of different natures require; as by simple laying, twisting, slitting, cutting the bark, piercing the shoot, wiring, &c.

Simple Laying.—This is merely laying the shoots in the earth, as directed below, without any previous preparation of twisting, slitting, &c. and is sufficient for a great number of trees and shrubs of the soft-wooded kinds; but for such as do not readily root by this simple method, recourse must be had to some of the following ways.

Twisting the Layer.—By giving the shoot a gentle twist in the part designed to be layed in the ground, it greatly promotes and facilitates the emission of fibres from the bruised part.

Slitting or Tonguing the Layer.—This is the most universal and successful mode, where any preparation of the shoot is necessary to promote its rooting; it is performed by slitting the shoot at a joint underneath, up the middle, half an inch or an inch or more long, according to the size and nature of the layer, forming a sort of tongue nearly the same as directed for

ernation layers; laying that part in the earth, and raising the top upright, or rather pointing inwards, so as to separate the tongue of the slit from the other part, and keeping the slit open, as directed below.

Cutting the Bark.—This is performed by cutting the bark all round at a joint, taking out small chips all the way below the cut, and laying that part in the earth, by which it readily emits roots.

Piercing the Layer.—This is done by thrusting an awl through the shoot, at a joint, in several places, laying that part in the ground, by which it will emit fibres from the wounds more readily.

Wireing the Layer.—This is by twisting a piece of wire hard round the shoot at a joint, and pricking it with an awl on each side of the wire in several places, laying it in the earth, by which it breaks out into roots at the confined and wounded parts; often proving successful in such trees and shrubs as do not readily emit fibres by the other methods.

By some of these methods almost all sorts of trees and shrubs may be propagated.

The general method of laying all sorts of trees or plants, either by simple laying, or any of the other methods, is the following.

The ground about each plant must be dug for the reception of the layers, making excavations in the earth to lay down all the shoots or branches properly situated for the purpose, pegging each down with a hooked stick, laying also all the proper young shoots on each branch or main shoot, fixing each layer from about three or four to six inches deep, according as they admit, and directly moulding them in that depth, leaving the tops of every layer out of ground, from about two or three to five or six inches, according to their length, though some shorten their tops down to an eye or two only above the earth, raising the top of each layer somewhat upright, especially the slit or tongued layers, to keep the slit part open. As all the layers of each plant or stool are thus laid, all the mould should be levelled in equally in every part, close about every layer, leaving an even smooth surface, with the top of each layer out.

It sometimes happens that the branches of trees are so inflexible as not to be easily brought down for laying; in which case they must be plashed, making the gash or cut on the upper side; and when they are grown too large for plashing, or the nature of the wood will not bear that operation, they may be thrown on their sides, by opening the earth about the roots, and loosening or cutting all those on one side, that the plant may be brought to the ground,

to admit of the branches being laid down into the earth.

When layers are to be made from green-house shrubs, or other plants in pots, the work should generally be performed in pots, either in their own, or others placed for that purpose.

After laying in either of the above methods, there is no particular culture necessary, except in the heat of summer giving occasional waterings to keep the earth moist about the layers, which will greatly forward them, and promote a good supply of roots against autumn, when those that are properly rooted should be taken off and transplanted.

The layed branches or shoots should be examined at the proper season, October and November, and those that are rooted be cut from the mother plant, with all the root possible, planting them out in nursery rows, a foot or two asunder, according to their nature of growth, there to remain till of due size for their several purposes; but those of the tender kinds must be potted, and placed among others of similar nature and growth.

When the layers are all cleared from the stools or main plants, the head of each stool, when to be continued for furnishing layers, should be dressed; cutting off all decayed and scraggy parts, digging the ground about them, working some fresh mould in close about their heads, to refresh and encourage their producing a fresh supply of shoots for the following year's laying down.

LEATHERWOOD. See DIRCA.

LEDON. See CISTUS.

LEDUM, a genus containing plants of the hardy evergreen kind. The Marsh Cistus, or Wild Rosemary.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leaved perianthium, very small, five-toothed: the corolla one-petalled, flat, five-parted: divisions ovate, concave, rounded: the stamens have ten filiform filaments, spreading, length of the corolla: anthers oblong: the pistillum is a roundish germ: style filiform, length of the stamens: stigma obtuse: the pericarpium is a roundish capsule, five-celled, gaping five ways at the base: the seeds numerous, oblong, narrow, sharp on each side, extremely slender.

The species cultivated is *L. palustre*, Marsh Ledum.

It has a branched root, running widely and deeply into the ground: the stems are shrubby, slender, three or four feet long, dividing into simple branches, and covered with a brown bark, which is tomentose or villose whilst they

are young, but afterwards becomes smooth: the leaves are linear-lanceolate, dusky green above, and smooth, underneath covered with a brown pile, quite entire, resembling those of Rosemary, but wider, petioled, and perennial: the flowers are on peduncles an inch or more in length, nodding before and after flowering, whitish, in axillary bundles or corymbs: the capsule small, obovate, terminated by a long permanent style: valves coriaceous: partitions membranaceous, springing from the edges of the valves, doubled, opening at their inner angle by a longitudinal chink: the receptacles five, filiform, curved a little, springing from the upper part of the axis of the fruit, and hanging down freely in the cavity of the cells. It is a native of the north of Europe, flowering in April and May.

It varies with erect and decumbent branches.

Culture.—These plants are increased by sowing the seeds in pots filled with boggy earth, or in shady borders of the same kind of mould, in the spring season.

But the best method is to take up the plants in their native situations, with balls of earth about their roots, and plant them in borders of the above kind, keeping them well watered.

Layers of the young shoots sometimes will grow.

They afford variety in shady situations, where the soil is of the boggy kind.

LEEKS. See ALLIUM.

LEMON TREE. See CITRUS.

LEPIDIUM, a genus containing a plant of the herbaceous annual kind.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliculosæ* or *Cruciformes*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate, concave, deciduous: the corolla four-petalled, cross-shaped: petals obovate, twice the length of the calyx, with narrow claws: the stamens have six awl-shaped filaments, length of the calyx, the two opposite ones shorter: anthers simple: the pistillum is a heart-shaped germ: style simple, length of the stamens: stigma obtuse: the pericarpium is a silicle, heart-shaped, emarginate, compressed, sharp on the margin, two-celled: valves navicular, keeled, opposite the lanceolate dissepiment: the seeds ovate-acuminate, narrower at the base, nodding.

The species cultivated is *L. sativum*, Garden or Common Cress.

Other species may be cultivated for variety.

It has an annual, white, fusiform, slender root: the stem upright, round, smooth, from a foot to two feet in height, branched at top: both stem and branches terminated by loose narrow spikes of flowers: the leaves oblong, al-

ternate, pinnate, the pinnas of the lower multifid, of the upper more entire, linear or lanceolate: the flowers small: the calyx very small, greenish: the petals white, larger than the calyx: the silicle roundish, without any style: the valves winged: the seeds small, rufescent, ovate, marked with lines, having a sharp taste like Mustard. Its native place is unknown.

There are several varieties, as with broad leaves, with curled leaves, and the common sort with the leaves multifid.

Culture.—These plants are raised by sowing the seed as wanted for use, at different times of the year, as once a week or fortnight, where a constant succession of small herbs in their young growth is wanted for sallads, when only a few days or a week or two old; or where a constant supply of those small herbs are required in their young seedling growth, some should, as has been observed, be sown in succession every week or fortnight at furthest, all spring, summer, and autumn; and once a fortnight in the winter season.

The order of sowing them in the different seasons is; in a warm south border or other similar situation, or under a frame, &c. in the early spring months; and as the warm season advances, in any open compartment, all in as light earth as the garden affords; but in summer, or hot dry weather, in somewhat shady borders, or in a free situation, shaded with mats from the scorching sun, and daily watered; and in winter in the warmest situation, or in shallow frames defended with lights, and under hand glasses: but in frosty or other very cold weather, in that season, on moderate hot-beds; and hot-bed sowings are also requisite during the colder part of the spring, or at any time in cold seasons, where a supply of these and other small-sallad herbs are required to be raised as quickly as possible.

The method of sowing the seed in all cases is very thick, as the plants are mostly used in small young growth, and mostly in small, flat, shallow drills, about three inches asunder, so thick as almost to cover the earth, being lightly earthed over a quarter of an inch thick, or less; or on the plain surface, first raking it smooth, then sowing the seed thick as above, smoothing it down with the back of the spade, and either with the spade spreading some fine earth lightly over it as thinly as possible, or covering it by sifting earth over it evenly a small depth, just to cover all the seed properly. This sort of sallad herb should always be cultivated so as to grow as rapidly as possible, being cut while perfectly young. See SMALL SALLAD HERBS.

LETTUCE. See LACTUCA.

LEUCOJUM, a genus containing plants of the bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx is an oblong, obtuse, compressed spathe, gaping on the flat side, withering: the corolla is bell-shaped-expanding: petals six, ovate, flat, conjoined at the base, with the tips thickish and stiffish: the stamina have six setaceous filaments, very short: anthers oblong, obtuse, quadrangular, upright, distant: the pistillum is a roundish inferior germ: style clavate, obtuse: stigma setaceous, upright, sharp, longer than the stamens: the pericarpium is a top-shaped capsule, three-celled, three-valved: the seeds several, roundish.

The species cultivated are: 1. *L. vernum*, Great Spring Snow-drop; 2. *L. æstivum*, Summer Snow-drop; 3. *L. autumnale*, Autumnal Snow-drop; 4. *L. strumosum*, Many-flowered Cape Leucojum.

The first has an oblong bulb, shaped like that of the Daffodil, but smaller: the leaves are flat, deep green, four or five in number, broader and longer than those of the Common Snow-drop: the scape angular, near a foot high, hollow and channelled: towards the top comes out a whitish sheath, opening on the side, out of which come out two or three flowers, hanging on slender peduncles: the corolla is much larger than that of the Common Snow-drop; and the ends of the petals are green. They appear in March, and have an agreeable scent, not much unlike those of the Hawthorn.

The flowers, which at first sight resemble those of the Common Snow-drop, are easily distinguished by the absence of the Three-leaved Nectary: they do not come out so soon by a month. It is called by Mr. Curtis, *Spring Snow-flake*. It is a native of Italy, &c.

The second species has a bulb the size of a Chestnut, somewhat ovate, outwardly pale brown, inwardly white; coats numerous, thin, and closely compacted. But Miller asserts, that it is nearly as large as that of the Common Daffodil, and very like it in shape: that the leaves also are not unlike those of the Daffodil, more in number than in the first, and keeled at the bottom, where they fold over each other, and embrace the stalk: the leaves are about a foot and half in length, upright, nearly linear, almost an inch in breadth, obtuse; the lower ones shortest: the scape a little higher than the leaves, hollow, slightly flattened, two-edged, a little twisted, one side sometimes obtuse, the other acute: the peduncles for the most part five from the same sheath, each supporting a single flower, angular, and of un-

equal lengths: the flowers are pendulous, growing all one way, having little scent: the petals are white, finely grooved within, not at all uniting at bottom; the tips thickish, a little puckered, and marked with a green spot. The flowers appear at the end of April or the beginning of May, and there is a succession of them during three weeks, or longer in cool weather. It is a native of Hungary, &c.

To distinguish it from *Galanthus*, Mr. Curtis names it *Summer Snow-flake*; and in gardens it is known by the name of *Great Summer Snow-drop*; *Late* or *Tall Snow-drop*.

The third has a thick bulb for the size of the plant, composed of many glutinous coats, bitter, covered with a whitish membrane: the scape slender, brownish, a hand in height, supporting two or three small white flowers (sometimes only one), hanging down, having no smell. It is distinguished by its four or five capillary leaves; which begin to spring up after the flower is past, when the seeds are ripening, and sometimes after the heads are ripe. They abide all the winter and spring following, and wither away in the beginning of summer; leaving the scape to appear naked: the flowers are a little reddish at the bottom next the stalk. It is a native of Portugal, flowering in September.

The fourth has a roundish white bulb, less than a hazel nut: the leaves two or three, inclosed at the base in a white sheath, filiform, dotted with white, keeled at bottom, flat, or a little convex on the back, weak, and more or less lying on the ground: scape flexuose-erect, slender, about half a foot high, roundish, terminated by a spreading umbel of from three to seven flowers: the valves of the spathe lanceolate, acute, membranaceous, opposite, sometimes equal, sometimes not, pale: the peduncles filiform, one-flowered, unequal, from one to two inches in length: flowers without scent, coming out successively: petals white within, purplish without, oblong, lanceolate, three lines in length; the three inner bluntish; the three outer acute, with a blunt, greenish keel: anthers purple: germ three-cornered, green: style white, swelled out at bottom into a body larger than the germ, plaited at bottom; thence awl-shaped, bluntly three-cornered, the length of the stamens: stigma obscurely trifid: capsule subglobular, three-cornered: the whole plant is smooth. It is a native of the Cape, flowering in November.

Culture.—These plants are readily increased by off-sets from the roots, which should be separated from the old roots about every third year, in the summer season, as soon as their leaves begin to decay, in the same manner as other bulbous roots. See **BULBOUS ROOTS**.

They may also be increased by seeds, which should be sown in the latter end of August, in a border of light bog earth. The plants should remain in this situation till the second summer, and be then taken up at the proper period and planted in beds, till they begin to flower, when they should be removed into the borders. In this way they are three or four years before they flower.

The best method is, to procure the roots from the nurserymen, and plant them in the beginning of the autumn, in an eastern or northern border, where the soil is of a boggy quality, in patches of three or four together, in the fronts, putting them in to the depth of about three or four inches.

The off-sets should be planted out in beds a year or two after being taken off, till fit to be set out for flowering.

A soft loamy soil, or a mixture of loam and bog earth, are the most suited to their healthy growth. The last sort requires protection in the house with other Cape bulbs.

By planting them in the different aspects mentioned, a longer succession of flowers may be produced.

They are very ornamental in the fronts of the borders, or the sides of the lawns, and other parts near the house.

LIGHT, a subtle fluid highly necessary to the healthy growth and vigour of plants.

The author of the *Philosophy of Gardening* remarks, that the contest for light as well as for air, which is so visible in the growth of vegetables, shows the former to be of great consequence to their existence, as well as the latter. "Thus," says he, "many flowers follow the sun during the course of the day, by the nutation of the stalks, not by the rotation of them, as observed in the Sun-flower, by Dr. Hales, and the leaves of all plants endeavour to turn their upper surfaces to the light, which is their respiratory organ, or lungs. The great use of all plants turning the upper surfaces of their leaves to the light, is thus rendered intelligible; the water perspired from those surfaces is, he conceives, hyperoxygenated; and, as it escapes from the sharp edges of the mouths of the perspiring vessels, when acted upon by the sun's light, gives out oxygen; which oxygen thus liberated from the perspired water, and added to that of the common atmosphere, presents to the respiratory terminations of the pulmonary vessels on the upper surfaces of leaves, an atmosphere more replete with vital air. This necessity of light to the respiration of vegetables is so great, he thinks, that there is reason to believe that many plants do not respire during the night, but exist in a torpid state, like winter-

sleeping insects. Thus the *Mimosa*, Sensitive Plant, and many others, close the upper surfaces of their opposite leaves together during the night, and thus preclude them both from the air and light; and the internal surfaces of innumerable flowers, which are their respiratory organs, are closed during the night, and thus unexposed both to light and air.

"It is however observed, that the *fungi*, which are termed vegetables because they are fixed to the earth, or to the stones, or trees, or timber, where they are found, can exist without light, or much air, as appears in the truffle, which never appears above ground; and by other *fungi*, which grow in dark cellars; and in esculent mushrooms, which are cultivated beneath beds of straw."

The etiolation or blanching of vegetables also depends upon keeping the light from them.

It is further contended, that "the element of light, as well as that of heat, is necessary to vegetation. In this climate they both seem in general to be injurious only by their defect, and seldom by their excess. But as light acts as a stimulus on the more irritative or sensitive parts of plants, which appear by the expansion of many flowers, and of some leaves, when the sun shines on them, and by the nutation of the whole flower, as of the Sun-flower (*Helianthus*), and by the bending of the summits of all plants confined in houses towards the light; there may be diseases owing to the excess of this stimulus, which have not been attended to; to prevent which, the flowers of *Tragepogon*, *Salsafi*, and of other plants, close about noon. Other unobserved diseases may be owing to a defect of the stimulus of light; as a *Mimosa*, Sensitive Plant, which had been confined in a dark room, did not open its foliage, though late in the day, till many minutes after it was exposed to the light." The excess of light has not, however, been observed to be attended by vegetable diseases in these more northern latitudes.

Experience has shown its infinite service to the growth of vegetables, contributing exceedingly to facilitate their vegetation, and increase their perfection and duration; as it is obvious that most plants are considerably more prosperous, and attain greater perfection, in a free exposure fully open to the light and air, than in shady places; the same is observed of fruits. Those growing in a situation full to the light of the sun, are in general more large and fair, ripening sooner, and more perfectly, as to beauty and richness of flavour, than such as grow in the shade: these reasons should therefore determine us to cultivate most of the principal plants and fruits in situations open as much as possible to the full light and influence of the

sun; though upon particular occasions, in the heat of summer, shady places may be necessary for some sorts of plants; though not where shaded and darkened by spreading trees, &c. but a border open above to the full light, and only shaded from the immediate rays of the sun. For the general crops, a perfectly open, sunny, light situation, free from the shade of spreading trees, is always the most proper.

Its utility is very evident, from plants growing in garden-frames, green-houses, &c. in winter, when, in time of severe weather, covers or shutters have been continued long over the glasses, so as to exclude the rays of light, becoming sickly, growing pale, and assuming an unhealthy appearance for a long time; the leaves often either decaying or dropping off; and frequently when the covers are continued very long without the admission of light, the whole plant in many sorts gradually dwindles and perishes. Great attention is of course requisite in this case, when, from the severity of the weather, the use of other covers besides the glasses is necessary, to take every opportunity of a favourable day, or even an hour or two of a day, to admit the light as fully as possible.

The same is also the case with plants in early hot-beds, such as Cucumbers, Melons, &c. which, early in the year, require a covering of mats over the glasses every night; as when these additional covers are applied too soon in the afternoon, and continued late in the morning, so as to keep the plants long in darkness, it is highly disadvantageous to their growth, causing them to grow weak, pale, and sickly.

As light is, therefore, so beneficial to plants in general, it should be increased as much as possible to those in frames, green-houses, stoves, &c. In these situations it may be useful to paint the inside of all such departments white, to reflect the rays of light as much as possible, and particularly in the nights, and in day-time when the severity of the season requires covers or shutters to be placed over the glasses.

LIGHTS, a term applied to the moveable glazed sashes which cover garden-frames; and which, according to the number of lights, or separate moveable glasses, are denominated one-light, two-light, and three-light frames; these being the general different sizes of garden-frames. See **FRAME**.

LIGUSTICUM, a genus containing plants of the herbaceous, biennial, and perennial kinds.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatae* or *Umbelliferae*.

The characters are: that the calyx is an universal umbel, manifold: partial manifold:
Vol. II.

involucre universal membranaceous, seven-leaved, unequal: partial scarcely four-leaved, membranaceous: perianthium proper five-toothed, obscure: the corolla is universal uniform: florets all fertile: proper of five petals, which are equal, involute, flat, entire, inwardly keeled: the stamina have five capillary filaments, shorter than the corolla: anthers simple: the pistillum is an inferior germ: styles two, approximated: stigma simple: there is no pericarpium: fruit oblong, cornered, five-furrowed, bipartite on each side: the seeds two; oblong, smooth, marked on one side with five elevated striae, flat on the other side.

The species cultivated are: 1. *L. levisticum*, Common Lovage; 2. *L. Scoticum*, Scotch Lovage; 3. *L. Austriacum*, Austrian Lovage.

The first has a strong, fleshy, perennial root, striking deep into the ground, and composed of many strong fleshy fibres covered with a brown skin, and having a strong hot aromatic smell and taste: the leaves are large, composed of many leaflets shaped like those of Sniallage, but larger, and of a deeper green: the stems six or seven feet high, large and channelled, dividing into several branches, each terminated by a large umbel of yellow flowers. It is a native of the Alps of Italy, &c. flowering in June and July, and the seeds ripening in autumn.

The second species has a biennial root, (perennial) of much less size than the preceding: the leaflets are broader and shorter; each leaf having two or three ternate leaflets, indented on their edges: the stalk rises about a foot high, and sustains a small umbel of yellow flowers, shaped like those of the preceding. It is a native of Scotland, North America, &c.

The third has a root half a foot long or more, the thickness of the human thumb, often branched, yellowish brown on the outside, pale within and spongy: the stem upright, from two to three feet in height, grooved, hollow without any partitions at the joints, the whole leafy, as thick as the thumb or finger, simply branched at top only: the root-leaves very large; the stem-leaves above the middle sessile: the leaflets of the general involucre lanceolate, acute, pale green with a whitish membranaceous edge, about half the length of the umbel, reflex, entire, or variously gashed; of the partial involucre about six, all commonly quite entire, the outer equalling the umbellets, and not bent back: terminating umbel of about forty rays, from four to seven inches in diameter: the rest much smaller; all close: these, which are at the tops of the branches, flower later, and gradually exceed the primary umbel in height, surrounding it when in fruit: the flowers are strong-

smelling, large, all fertile. It is a native of Austria, &c. flowering from June to August.

Culture.—These plants are increased by sowing the seeds either in the places where they are to remain, or in beds of light earth, in the autumn or spring, but the former is the better method, raking them lightly in. When the plants have attained a few inches growth, they should be removed from the beds into other beds, where the soil is moist, and set out two feet apart each way, and in the autumn those for the border removed into them; but the above is the better practice.

The plants sown where they are to grow, should be thinned out in the spring, and be kept clean from weeds.

They may be admitted in large borders for the purpose of variety. The first is also used as a medicinal plant.

LIGUSTRUM, a genus containing a plant of the hardy deciduous and evergreen shrubby kind—Privet.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariae*.

The characters are: that the calyx is a one-leaved, tubular perianthium, very small: mouth four-toothed, erect, obtuse: the corolla one-petalled, funnel-form: tube cylindric, longer than the calyx: border four-parted, spreading: divisions ovate: the stamina have two filaments, opposite, simple: anthers upright, almost the length of the corolla: the pistillum is a roundish germ: style very short: stigma two-cleft, obtuse, thickish: the pericarpium is a globose berry, smooth, one-celled: the seeds four, convex on one side, cornered on the other.

The species cultivated is *L. vulgare*, Common Privet.

It is a shrub, usually about six feet in height, branched, the bark of a greenish ash-colour, irregularly sprinkled with numerous prominent points: branches opposite, the young ones flexible and purplish: the leaves opposite, on very short petioles, smooth on both sides, perfectly entire, the lower ones at the bottoms of the small branches least: the panicle about two inches in length, close and somewhat pyramidal; branches and pedicels appearing villose when magnified: the corolla white, but soon changing to a reddish-brown: the flowers are sweet-scented: berry superior, fleshy, subglobular, shining, of so dark a purple as to seem black: it is found wild in most parts of Europe, &c. flowering in July, and the berries ripening in autumn.

There are several varieties; as with the leaves in threes and enlarged at the base, with silver-striped leaves, with gold-striped leaves, with white berries; and Evergreen or Italian Privet, which

rises with a stronger stem, the branches less pliable, and grows more erect; the bark is of a lighter colour; the leaves much larger, ending in acute points, of a brighter green, and continue till they are thrust off by the young leaves in the spring: the flowers are rather larger, and are not often succeeded by berries in this climate.

The chief use of the common sort is to form such hedges as are required in dividing gardens for shelter or ornament; and for this the Italian or Evergreen kind is usually preferred: it bears clipping well, is not liable to be disfigured by insects, and having only fibrous roots, it robs the ground less than almost any other shrub: it is one of the few plants that will thrive in the smoke of large towns, though it seldom produces any flowers in the closer parts after the first year: it also grows well under the drip of trees and in shade: the *Sphinx Ligustri*, or Privet Hawk Moth, and *Phalaena Syringaria*, feed on it in the caterpillar state, and *Meloe vesicatorius*, *Cantharides* or Blister Beetle, is found on it. From the pulp of the berries a rose-coloured pigment may be prepared: with which, by the addition of alum, they dye wool and silk of a good durable green: for which purpose they must be gathered as soon as they are ripe.

Culture.—These plants are capable of being increased by seed, layers, suckers, and cuttings; but the first method affords the best plants: the seed should be sown in autumn, in a bed of common earth an inch deep, or in drills the same depth; but as they do not always grow freely the first year, they may be buried till next autumn, in pots of sandy earth, in the ground, and then sown as above: when the plants come up they should be kept well weeded, and, when a year or two old, be planted out in nursery-rows, to remain two or three years, then removed where they are wanted to remain: the layers should be laid down, from some of the pliable young branches, in the earth, in autumn or winter, when they will be well rooted by the autumn following; then take them off from the stool, with their roots, and plant them in the nursery for a year or two, or till of proper size for the purposes they are intended for: the suckers which rise annually from the roots should be taken up in autumn, winter, or spring, with roots, and planted in the nursery as above: the cuttings of the young shoots, eight or ten inches long, should be planted in the autumn, in a shady border, where they will be properly rooted by the following autumn, when they may be planted out in nursery rows, to acquire proper growth, in the manner directed above. The varieties with striped leaves may be increased by budding, or inarching, upon the plain

sort; or by laying down the branches,—but they seldom shoot so fast as to produce branches proper for this purpose; and being more tender, they should have a dry soil and a warm situation: in a rich soil they soon lose their variegation, and become plain. The Italian or Evergreen sort, which is now generally found in the nurseries, is equally hardy, and thrives in almost any situation: it is increased in the same manner; but as it seldom produces berries in this climate, they must be procured from the place of its native growth.

The plants, besides their use as above, may be introduced in the shrubberies and other parts, by way of variety, especially the Evergreen sort.

LILAC. See *SYRINGA*.

LILIUM, a genus containing plants of the bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla is six-petalled, bell-shaped, narrowed beneath: petals upright, incumbent, obtusely carinated on the back, gradually more expanding, wider; with thick, reflex, obtuse tips: nectary, a longitudinal, tubular line, engraven on each petal from the base to the middle: the stamina have six awl-shaped filaments, upright, shorter than the corolla: anthers oblong, incumbent: the pistillum is an oblong germ, cylindric, striated with six furrows: style cylindric, length of the corolla: stigma thickish, triangular: the pericarpium is an oblong six-furrowed capsule, with a three-cornered, hollow, obtuse tip, three-celled, three-valved; the valves connected by hairs disposed in a cancellated manner; the seeds are numerous, incumbent in a twin order; flat, outwardly semi-orbicular.

The species cultivated are: 1. *L. candidum*, Common White Lily; 2. *L. Catesbæi*, Catesby's Lily; 3. *L. bulbiferum*, Bulb-bearing or Orange Lily; 4. *L. Martagon*, Purple Martagon Lily, or Turk's Cap; 5. *L. Pomponium*, Pomponian Lily; 6. *L. chalcedonicum*, Scarlet Martagon Lily; 7. *L. superbum*, Great Yellow Martagon Lily; 8. *L. Canadense*, Canada Martagon Lily; 9. *L. Camschatcense*, Kamtschatka Lily; 10. *L. Philadelphicum*, Philadelphian Martagon Lily.

The first has a large bulb, from which proceed several succulent fibres: the stem stout, round, upright, usually about three feet in height: the leaves numerous, long, narrow-pointed, smooth, sessile: the flowers large and white, terminating the stem in a cluster on short peduncles: the petals within of a beautiful shining white;

on the outside ridged and less luminous. It is a native of the Levant, flowering in June and July.

The principal varieties are; with striped flowers, or with blotched purple flowers, or with variegated striped leaves, or with yellow-edged leaves, with double flowers, and with pendulous flowers.

The first of these varieties is now become common; but the purple stain giving the flower a dull colour, the common white is generally preferred: the second is chiefly valued for its appearance in winter and spring; for the leaves coming out early in the autumn, spreading themselves flat on the ground, and being finely edged with a broad yellow band, make a pretty appearance during the winter and spring months, as it flowers earlier than the plain sort: the third is of little value, as the flowers never open well unless they are covered with glasses, nor have they any of the rich odour of the common sort: the fourth came originally from Constantinople; the stalk is much more slender; the leaves narrower and fewer in number; the flowers not quite so large, and the petals more contracted at the base; they always hang downwards; the stalks are sometimes very broad and flat, appearing as if two or three were joined together: when this happens, they sustain from sixty to one hundred flowers, and sometimes more; this however is merely accidental, as the same root scarcely ever produces the same two years together.

The second species is one of the least of the cultivated sorts, the whole plant when in bloom being frequently little more than a foot high; in its native soil it is described as growing to the height of two feet: the stalk is terminated by one upright flower: it is purple, slender, upright, round, smooth with a slight glaucous bloom on it, solid, stiffish: the root-leaves few, often only on the barren plant, on long petioles: the stem-leaves are numerous, alternately scattered, sessile, curved back, narrow-lanceolate, the upper ones gradually more ovate-lanceolate, quite entire, blunt with a purple tip, even on both sides, slenderly nerved, flat, a little fleshy, shrivelling: the flower has no scent, but is said by Catesby, to be variously shaded with red, orange, and lemon colours: it is remarked by Mr. Curtis, that it varies considerably in the breadth of its petals, in their colour and spots; and that it flowers usually in July or August.

The third has a subovate bulb in its native state, consisting of thick white loosely imbricate scales, putting out a few thick fibres from the bottom: the stem upright, a foot and half high, striated-angular, smooth or slightly hairy, with numerous scattered leaves, the upper ones spread-

ing out horizontally, acute, quite entire, absolutely hirsute, a little rough to the touch, dark green, slightly nerved, sessile, lanceolate-linear, three or four inches long; each, excepting the lower, frequently producing a roundish and shining pale-green bulb or two in the axil: the peduncle terminating, round, thick, somewhat villose; either solitary, or two, three or four together, forming a sort of umbel; some naked, others having a bracte or two: the flower without scent, red-orange within, pale-orange on the outside. It is a native of Austria, &c.

There are varieties with double flowers, with variegated leaves, with smaller stems, and the bulb-bearing fiery Lily, which seldom rises more than half the height of the others: the leaves are narrower: the flowers smaller, and of a brighter flame-colour, few in number and more erect; they come out a month before those of the common sort, and the stalks put out bulbs at most of the axils, which, if taken off when the stalks decay, and planted, produce plants.

The sub-varieties are: the great broad-leaved, the many-flowered, the small, and the hoary bulb-bearing Lily.

The fourth species rises with a strong stalk from three to four feet high: the leaves are broad; the flowers dark purple, with some spots of black; they are produced in loose spikes, appear in June, and have a disagreeable odour when near, but not so offensive as the seventh sort: the bulb is, according to Martyn, composed of lanceolate, yellow, loose scales, with thick, long, whitish fibres at bottom: the stem straight, round, shining, from a foot and a half to four feet in height, at the top of the bulb furnished with rooting fibres in whorls, pale green at bottom, the rest having black spots scattered over it, above and below the leaves are scattered, but in the middle they are in whorls; lanceolate, acute, somewhat nerved, quite entire, subpetioled; the stem terminates in a loose raceme, many-flowered, few-flowered, or sometimes one-flowered only: the peduncles purple, dotted with black, with lanceolate sharp bractes, two to the lower, and one to the upper flowers: the petals purple or pale, more or less spotted with black on both sides, the three outer hirsute, with a raised line along the middle. It is a native of the south of Europe, &c.

It varies with white flowers, with double flowers, with red flowers and hairy stalks, and with imperial divided stalks.

The fifth species has a pretty large yellow scaly root, from which arises an upright stalk nearly three feet high, with long narrow leaves, almost triangular, having a longitudinal ridge on their under side; they are deep green, and ter-

minate in acute points; the upper part of the stalk divides into four or five peduncles, each sustaining a single flower of a fine carmine colour, with a few dark spots scattered over it; they appear in July, and, when the season is not hot, continue a considerable time in beauty. It is a native of the Pyrenees, &c.

It varies with double red flowers, with white flowers, with double white flowers, with red spotted flowers, with white spotted flowers, with yellow flowers, with yellow spotted flowers, with early scarlet flowers, and the Major Scarlet Pompony.

The sixth species is from three to four feet in height; the leaves are much broader than those of the fifth sort, and appear as if they were edged with white; they are placed very closely upon the stalks: the flowers are of a bright scarlet, and seldom more than five or six in number: it flowers late in July, and in cool seasons continues in beauty great part of August. It is remarked by Linnæus, that the raceme, before the flowers open, is scarcely curved in, as in the fifth sort, and that the stem is clothed with clustered leaves to the very top. It is a native of the Levant.

According to Mr. Curtis, it varies in the number of flowers, from one to six, and the colour in some is of a blood red: also with deep scarlet flowers, with purple flowers, and with large bunches of flowers.

The seventh has a round stem, very smooth and even, panicled at top, two feet high and more; the branches alternate, divaricating, upright, like the stem, reflex at top, flower-bearing: the stem-leaves alternate, subpetioled, folded together at the base, ovate-oblong, acute, quite entire, smooth, five-nerved beneath, spreading; one flower at the end of each branch: the corollas are large and handsome: the petals oblong, acute, white with large purple spots and smaller black ones from the middle to the base: nectareous keel bearded: according to Catesby the flowers grow alternately on long footstalks, and are of an orange and lemon colour, thick spotted with dark brown; but Miller says they are produced in form of a pyramid, and when the roots are strong there are forty or fifty on a stalk, large, yellow with dark spots, and make a fine appearance, but smell so disagreeably, that few persons can endure to be near them: they appear at the end of June. It is a native of North America.

The eighth species has oblong and large bulbs: the stems from four to five feet high: the leaves oblong and pointed: the flowers large, yellow spotted with black, shaped like those of the orange lily, and the petals not turned back so much as in the other Martagons: they come out

in the beginning of August, and, when the roots are large, in great numbers, making a fine appearance. According to Catesby, on the top of the stem are about twelve pendulous flowers on long arched peduncles, and the petals are reflected very little. It flowers in July and August, and is found in North America.

There is a variety with larger deeper-coloured flowers.

The ninth has a roundish small bulb: the stem quite simple round, even, a foot high: the leaves lanceolate or lanceolate-linear, sessile, four or six, striated, rather blunt, even, upright; two or three of the upper ones usually alternate, narrower: the flowers terminating, few, an inch and a half in diameter, on very short, naked, almost upright peduncles: the petals ovate, blunt, even, striated, purple, not rolled back, attenuated at the base: the filaments shorter by half than the corolla: the anthers upright: the germ triangular and oblong: style none: stigmas three, oblong, curved back, almost the length of the germ. It is a native of Kamtschatka.

The tenth species has a smaller root than in the other sorts, scaly and white: the stem single, upright, near a foot and half high: the leaves in four or five whorls, short, pretty broad, obtuse: the stem terminated by two flowers which stand erect, upon short separate peduncles; they are shaped like those of the bulb-bearing fiery Lily, but the petals are narrower at their base, so that there is a considerable space between them, but upwards they enlarge and approximate, forming a sort of open bell-shaped corolla, but they terminate in acute points: are of a bright purple colour, marked with several dark purple spots towards the base. It flowers in July, and the seeds ripen at the end of September. It is a native of North America.

Culture.—All the sorts are capable of being increased by planting the off-sets of the root, and by sowing seeds to obtain new varieties.

All the sorts of these roots afford plenty of off-sets every year, which when greatly wanted may be taken off annually in autumn; but once in two or three years is better, according as they are wanted; the proper time for which is in summer and autumn, when the flower is past and the stalks decayed, either separating the off-sets from the mother bulbs in the ground, or taking the whole up, and separating all the off-sets, small and great, from the main bulbs; the small off-sets being then planted in beds a foot asunder and three inches deep, to remain a year or two; and the large bulbs again in the borders, &c. singly. The off-sets in the nursery beds may also, after having obtained size and

strength for flowering in perfection, be planted out where they are wanted.

The sowing of the seed is chiefly practised for the Martagons to obtain new varieties, which should be done in autumn, soon after the seed is ripe, in pots or boxes of rich light sandy earth, with holes in the bottoms half an inch deep; placing the pots in a sunny sheltered situation all winter, refreshing them at first often with water, and the plants will appear in the spring; when, about April, remove them to have only the morning sun all the summer, giving moderate waterings: in August the bulbs should be transplanted into nursery-beds in flat drills, an inch deep, and three or four asunder; when, as the bulbs will be very small, scatter the earth and bulbs together into the drills, covering them with earth to the above depth; and after having grown in this situation till the August or September following, they should be transplanted into another bed, placing them eight or nine inches each way asunder, to remain to show their first flowers; after which they may be finally planted out into the pleasure-ground.

New varieties of the other sorts may be raised in the same way.

The bulb-bearing varieties may also be increased by the little bulbs put forth from the axils of the leaves without taking up the old bulbs.

The same method of planting and general culture answers for all the different sorts.

The most proper time, as has been seen, for planting and transplanting them is in autumn, when their flowers and stalks decay, which is generally about September, the roots being then at rest for a short space of time, as well as for procuring roots to plant. The bulbs taken up at the above season may be kept out of ground, if necessary, till October or November: the White Lilies, however, do not succeed if kept long out of the earth, and all the others succeed best when planted again as soon as possible. The bulbs of all the sorts are sold at the nurseries.

They should be planted singly, as they soon increase by off-sets into large bunches, disposing them in assemblage in different parts of the borders, and towards the fronts of the principal shrubbery clumps; placing them three or four inches deep, and at good distances from one another, intermixing the different sorts, placing some forward, and others more backward, to effect the greater show and variety.

Some may likewise be planted in separate beds by themselves, twelve or fifteen inches asunder; either of different sorts together, or each in distinct beds, or in separate rows, &c.

After being thus planted out, few of the sorts require any particular culture, as they are capable of enduring all weather at every season. It is however necessary to destroy all weeds; and, as some of them run up with pretty tall slender stalks, to support them with sticks to preserve effectually their upright position, by which their flowers will appear to the best advantage.

Some of the more tender sorts, as the second, fourth, eighth, and tenth species, should, however, be protected in severe winters, by applying tanner's bark or some other similar substance over their roots.

They should all, as has been said, remain undisturbed two or three years, or longer, as by remaining they flower stronger after the first year; and having increased by off-sets into large bunches, many stalks will rise from each bunch of roots, so as to exhibit a large cluster of flowers: it is, however, proper to take up the bulbs entirely every three or four years at least, at the decay of the stalk, to separate the increased off-sets, both for propagation and to disburthen the main roots, and give them room to take their proper growth in.

After being taken up in the autumn, all the sorts should, as just observed, be replanted as soon as possible, especially the White Lily sorts, as they soon begin to emit roots.

They are all valuable as plants of ornament for the beauty of their flowers, which have a noble appearance: they are of course proper ornaments for the pleasure-ground; and when the different sorts are properly intermixed, they effect a most elegant variety, succeeding each other in blow upwards of three months. When wanted particularly for shady or close places, the common White Lily, Orange Lily, and common Martagons, are the most proper, as they thrive under trees. The Orange Lily also answers well in small gardens, in the midst of buildings in towns and cities. Besides planting the different sorts for the beauty of their flowers, many of the striped-leaved White Lily sorts should be placed towards the fronts of the most conspicuous parts for the beauty of their leaves in autumn, winter, and spring, which, if disposed alternately with the Common White Lily, whose leaves are entirely green, a most striking variety will be produced.

The tall-growing sorts are only proper for large borders and clumps, in mixture with other large herbaceous plants.

LILIACEOUS PLANTS, such as resemble those of the Lily kind, in their flowers having six regular petals, in the form of a Lily, or three, or even one petal deeply divided into six segments, assuming a lily-flower form; they have not,

however, all flowers so large as that of the Lily, some being considerably smaller; and as the common Lily has no calyx, so several of the liliaceous flowers are also destitute of a cup; and others have cups, which are principally of that sort called a spathe. They may therefore be distinguished into such as have cups and such as have not.

Those without cups are: all the different sorts of common lily; the tulip, all the kinds; fritillary, and crown imperial; hyacinth; star of Bethlehem; bastard star of Bethlehem; tuberose; asphodel; squill; hemerocallis, or day-lily; anthericum, or spider-wort; aloe; yucca, or Adam's needle; gloriosa, or superb lily, &c.

Those with spathes or cups are: the crocus; galanthus, or common snow-drop; leucojum, or great snow-drop; daffodil, narcissus, and jonquil; crinum, or asphodel lily; colchicum; iris, or flower-de-luce; hæmanthus, or blood-flower; gladiolus, or sword-lily; Virginia spider-wort; amaryllis, including the Guernsey lily, belladonna lily, and Jacobæa lily, &c.; paneratum lily, &c.

The greater part of these liliaceous plants of both kinds are bulbous-rooted; some, however, have tuberous and some fibrous roots; and all of them are perennial in root, but annual in stalk.

They are all ornamental garden-flowers, and most of them sufficiently hardy to grow in the open ground; though a few are proper for the green-house and stove. See the different *Genera*.

LILY. See **AMARYLLIS**, and **LILIUM**.

LILY-OF-THE-VALLEY. See **CONVALLARIA**.

LIME TREE. See **CITRUS**.

LIME WATER, such as is prepared by slaking caustic lime in soft water, in the proportion of half a peck of the former to thirty-two gallons of the latter, letting them remain some time before they are made use of, stirring them well, two or three times a day, for two or three days. This liquid, when the lime has subsided, is found highly useful in clearing fruit-trees from the ravages of the Aphis Puceron, or Vine-Fetter. It should be applied once a day by means of an engine so as to be thrown as much as possible on the under sides of the leaves, and with considerable force, pressing the fore finger upon the end of the pipe, to make it spread like small rain, and taking care that every part of the tree be well watered. It should be done as much as possible in cloudy weather, and when the sun is off the walls. Where the trees have an easterly aspect, they may be watered about half past eleven o'clock

in the forenoon, and in a northern one, the first thing in the morning; but in a southern aspect, about four o'clock in the afternoon. And when northerly or easterly winds and frosty nights prevail, it should be discontinued till the weather becomes mild. The trees should always get dry before night, and never be watered when the sun is upon them. Care must likewise be taken that the grounds of the lime be not made use of, as it would make the trees have a disagreeable appearance. See PUCERON and VINE-FRETTER.

LIMODORUM, a genus containing plants of the bulbo-tuberous-rooted herbaceous perennial kind.

It belongs to the class and order *Gynandria Diandria*, and ranks in the natural order of *Orchideæ*.

The characters are: that the calyx has vague spathes: spadix simple: there is no perianthium: the corolla, petals five, ovate-oblong, about equal, spreading: the superior ones converging: nectary one-leaved, concave, footstalked, within the lowest petal; the length of the petals: the stamina two: filament an oblong, ascending body, the length of the corolla: anthers two, ovate, looking forwards: the pistillum is a columnar germ, the length of the corolla; inferior: style filiform, growing to the body of the filaments: stigma funnel-form: the pericarpium is a columnar capsule three-valved, one-celled, gaping at the corners: the seeds numerous, saw-dust-like.

The species cultivated are: 1. *L. tuberosum*, Tuberous-rooted Limodorum: 2. *L. altum*, Tall Limodorum: 3. *L. Tankervilleæ*, Chinese Limodorum.

The first has a tuberous root: the stem a foot and half high: the number of flowers not exceeding five, dark purple: in a more luxuriant state it is probably a larger plant, and produces more flowers. It is a native of North America.

The second species has a root shaped like that of the true Saffron, but the outer cover of a darker brown colour; from this come out two or three leaves nine or ten inches long, and near three quarters of an inch broad in the middle, being contracted towards both ends, terminating with long acute points, folding over each other at their base; they have five longitudinal furrows, like the first leaves of young palms: the flower-stalk arises immediately from the root, on one side of the leaves; it is naked, smooth, and of a purplish colour towards the top: it is near a foot and a half high, and terminated by a loose spike of purplish red flowers on short peduncles. The bulb tubercled, roundish, of a fleshy and fibrous

substance, covered with a coriaceous shining skin, and having some tomentose white fibres underneath: the leaves from the bulb, vernal, two feet long, broad-lanceolate, longitudinally folded at the nerves, even, very like those of a young plant of the coco palm: scape simple, upright, sometimes subdivided at top, two feet high, even, round; it has little sheaths on it, which are remote, præmorse, embracing, netted, pale: the flowers terminating, scattered, alternate, large, purple, sometimes varying to white. It is a native of the West Indies, flowering in June and July.

The third has a bulb fibrous root, from which proceed three or four oblong, oval, pointed leaves plaited and narrowed at the base, about a foot and a half in length, and seven inches in breadth in the middle part: the flower-stalk rises from the root upwards of two feet in height, and is furnished with a long spike of large beautiful flowers, each consisting of five oblong spreading petals of a pure white on their upper-side, and brown underneath, with a large concave nectarium tinged with red towards the extremity, and succeeded by a three-cornered columnar germen inclosing the seeds. It is a native of China, flowering in March and April.

Culture.—These plants are increased by planting the off-sets from the roots in pots of bog earth, plunging them in the first sort in a mild tan-pit, and in the others in the tan hot-bed of the stove. The proper time of taking them off is when the plants are the most destitute of leaves.

The two last sorts should have a loamy mould, and but little water in the winter season.

The first requires the protection of a good green-house in winter, and the two last must be kept in the bark-bed of the stove.

They afford variety in the green-house and stove collections.

LIMON. See CITRUS.

LINING HOT-BEDS, the practice of applying a layer of hot-dung to the sides of the beds to revive and keep up the declining heat. It is essentially necessary in the culture of plants on dung hot-beds in early seasons in winter or spring, until May. As these hot-beds generally in from three or four to five or six weeks, according to their substance, begin to decline in their degree of heat, they require a revival to continue them in regular heat; which in dung hot-beds can only be effected in this manner. It is applied to one or both sides as there may be occasion.

Thus, by the occasional repetition of two, three, or more linings, a hot-bed is continued in a proper degree of heat several months, as exem-

plified in early cucumber and melon hot-beds, which, without the aid of occasional linings, would not retain sufficient heat to forward their respective plants, &c. to proper perfection.

Dung for this purpose must be of the best fresh horse stable kind, moist and full of a steamy lively heat, being prepared in the manner described under *HOT-BED*, and in proper quantity to make the lining substantial, fifteen or eighteen inches wide, and as high as the dung of the hot-bed; as when too slender they do not effect the intended purpose, especially in early beds, or when the heat is considerably decreased.

In early hot-bed work, care should be taken, according to the extent of the bed or beds and season of the year, to allot and reserve a sufficiency of dung for linings: early beds in very cold weather will generally require more substantial and frequent linings than later-made beds in the advanced spring months; and some hot-beds, for slight or temporary uses, just to raise plants for two or three weeks, will sometimes require but very little or no linings. Hot-beds made late, as in the beginning or any time in May, will need but very trifling linings, or some not at all, except in particular uses as when plants are rather backward in growth, the weather cold, and the bed declined much in heat, when, probably, even in May, or beginning of June, a final moderate lining may be necessary.

The requisite linings should be applied to the respective hot-beds in proper time, as it may be necessary on examining the state of heat, not letting them decline too considerably before they are applied, but to continue always a moderately lively heat, but never violent: linings are sometimes applied by degrees, raising them only half way at first, adding more in height in a few days, and thus proceeding till they are raised to the height of the hot-beds.

In the application of linings, it is generally necessary to line only one side at a time, commonly the back part of the bed first; and in a week or fortnight after to line the front side, and both ends if necessary; or in particular cases of the hot-bed having suddenly declined, or been permitted to decrease very considerably in heat before applying the lining, to line both sides moderately at once, about twelve or fifteen inches in width, but only as high as the dung of the bed at first; being afterwards a little augmented by degrees according as the dung of the lining settles.

The general requisite substance of the linings is from twelve to fifteen or eighteen inches width in dung, and as high as the dung of the

bed, or sometimes a few inches higher: but for early bed of cucumbers, melons, or other plants of long continuance in hot-beds, they should generally be laid from fifteen to eighteen inches in width at bottom, as conceived necessary, narrowing the width gradually upwards to eight, ten, or twelve inches at top, which may be raised at once to the full height of the dung of the bed, or a few inches higher up the side of the frame, to allow for settling; but with a strong lining, be cautious in raising it much above the dung of the hot-bed, especially when made of very strong, hot, steamy dung, for fear either of its throwing in a too strong heat above to burn the internal earth of the bed, or imparting a copious rank steam to penetrate within the frame, which would steam-scald tender plants.

In general, as soon as the linings are raised to the intended height, it is proper to lay a stratum of earth at top two inches thick, close up to the bed or bottom part of the frame, sloping a little outward to throw off the falling wet of rain, snow, &c. which top covering of earth is essential, both to keep the heat of the linings from escaping too considerably above, in order that it may be directed more effectually to its intended purpose of imparting its whole or principal heat internally to the revival of that of the bed, and prevent the strong steam arising immediately from the rank dung from entering the frame at bottom, or through any small crevice, or at top, when the lights are occasionally raised for the admission of fresh air, as the rancid dung steam thus produced, without being moderated by first passing through a stratum of earth, if it should enter within the frame considerably, would prove very pernicious to most plants, and the total destruction of some kinds.

As the heat of the linings declines to any extent, they must be renewed by a supply of fresh hot dung. This may sometimes be effected by turning over, and shaking up the same dung mixedly together, directly forming it again into a lining: or some of the best or least decayed or exhausted parts of the old lining may only be used, mixing it up properly with a good supply of new dung, applying it immediately in a proper substantial lining as before.

When the dung of the linings is greatly exhausted, fresh dung should mostly be used in the renewal.

Linings of hot dung are sometimes used substantially, in working some sorts of forcing-frames, in raising early flowers and fruits, by applying the dung against the back of the frame, two or three feet in width at bottom, narrowing gradually to a foot and a half, or less, at

the top, raising the whole according to the height of the frame, from four or five to six or seven feet; which heating considerably against the whole back of the frame, communicates the heat internally, by which the different plants are forwarded to early production; supporting the internal heat by renewing the linings. See FORCING FRAME.

Linings of dung are also sometimes used in supporting the heat of nursery hot-beds for young pine-apple plants, and some other exotics of the hot-house or stove, both in dung and tan-bark hot-beds, under proper frames and glasses; as well as those wintered in these detached hot-beds distinct from the hot-house, &c. and in which a constant regular heat, almost equal to that of the stove, must be supported, so that, when the natural heat of the bed is on the decline, a strong lining of hot dung must be applied, half a yard or two feet wide below, narrowing moderately upward, and continued on both sides occasionally; and as the heat of these linings subsides, it must be immediately renewed by a supply of fresh dung, either worked up with the best of that of the declined lining, or, if this is much decayed, wholly of new; and thus the hot-beds maintained in a proper degree of heat from autumn till spring.

The decayed dung of the different linings, when done with, becomes excellent manure for the kitchen-garden.

LINUM, a genus containing plants of the herbaceous, annual, and perennial shrubby kinds.

It belongs to the class and order *Pentandria Pentagynia*, and ranks in the natural order of *Grinales*.

The characters are: that the calyx is a five-leaved lanceolate perianthium, upright, small, permanent: the corolla funnel-form: petals five, oblong, gradually wider above, obtuse, more spreading, large: the stamina have five awl-shaped filaments, upright, length of the calyx (also five rudiments, alternating): anthers simple, arrowed: the pistillum is an ovate germ: styles five, filiform, upright, length of the stamens: stigmas simple, reflex: the pericarpium a globose capsule, rudely pentagonal, ten-valved, gaping at the tip: partitioned membranaceous, very thin, connecting the valves: the seeds solitary, ovate-flatish, acuminate, smooth.

The species are: 1. *L. usitatissimum*, Common Flax; 2. *L. perenne*, Perennial Flax; 3. *L. suffruticosum*, Shrubby Flax; 4. *L. arborescens*, Tree Flax; 5. *L. Africanum*, African Flax.

The first has an annual, simple, fibrous, pale

VOL. II.

brown root: the stem upright, eighteen inches, two feet, and even more in height, round, smooth, leafy, branched only at top: the leaves are sessile, growing close together, almost upright, perfectly entire: the flowers large, growing in a panicle, on round smooth peduncles: the calycine leaflets ovate-keeled, with a membranous edge, when magnified appearing to be fringed with hairs: the petals wedge-shaped, deciduous, sky-blue, streaked with deeper-coloured lines; white at the claws, and somewhat gnawed at the tip. It is a native of Egypt, flowering in Jude and July.

It may be said to be one of the most valuable plants in the whole vegetable kingdom; as from the bark of its stalks is manufactured flax or lint, for making all sorts of linen cloth; from the cloth, when worn to rags, is made paper: and from the seeds of the plant linseed oil is expressed, which is much used by painters, and in other arts; and the refuse, after expression, forms the oil-cakes so valuable in the fattening of cattle and sheep.

In the second species, from its perennial root rise three or four inclining stalks, having short narrow leaves towards their base, but scarcely any about the top: the flowers are produced at the ends of the stalks, sitting very close; they are blue, and about the size of the cultivated sort, being succeeded by pretty large round seed-vessels, ending in acute points. Its flowers appear from June to August, and are of a delicate texture and very elegant blue colour, and the roots continue four or five years.

There is a variety which is procumbent, with smaller flowers.

The third has a shrubby stalk a foot high, sending out several branches: the leaves very narrow, coming out in clusters, but on the flowering branches broader and longer: the flowers at the ends of the branches, erect, on long slender peduncles: the calyxes acute-pointed: the petals large, entire, white, but before the flowers open pale yellow: they appear in July, but the seeds seldom ripen in this climate: the flowering stalks decay in the autumn, but the lower shrubby part continues with the other branches all the year. It is a native of Spain, &c.

The fourth species forms, if not a tree, as its name implies, a shrub of the height of several feet: it begins to flower in March, and continues flowering to the close of summer; but has not yet produced seeds in this climate. It is a native of the island of Candia.

The fifth has a suffruticose stiff stem, a foot high, round, with simple branches: the leaves are sessile, upright, even, generally shorter than

K

the internodes; the flowers in a terminating umbel, which is four- or five-cleft, with dichotomous rays: the petals are yellow with villose claws, and turning tawny: the calyx acuminate and rugged at the edge. It is a native of Africa, flowering in June and July.

Culture.—These plants may be increased by seeds and layers, or cuttings.

The two first sorts are raised by sowing the seeds in the early spring months, as March or the following month, the former in fields or plantation-grounds, where the soil is fresh, good, and well reduced into order by frequent digging over, or ploughing and harrowing, in narrow drills, or broadcast, and raked or harrowed in with a light harrow: the plants being afterwards kept perfectly clean from weeds by repeated hoeings.

Towards the end of August, when the plants have attained their full growth, and begin to turn yellow at bottom, and brown at top, and their seeds to ripen, it is proper time to pull them; though, if it were not for the sake of the seed, they might be pulled a little before the seeds ripen, by which the flax is generally better coloured and finer; but if suffered to stand till the seeds are fully ripe, it is commonly stronger, somewhat coarser, and more in quantity. It should be pulled up by handfuls, roots and all, shaking off all the mould; then either spreading them on the ground by handfuls, or binding them in small bunches, and setting them upright against one another, for ten days or a fortnight, till they are perfectly dry, and the seed fully hardened, then housed, and the seed thrashed out, cleaned, and placed in a dry airy situation, being afterwards put up for use. The flax, after being rippled and sorted, should be carried to a pond of nearly stagnant water, being placed in it with the bundles crossing each other in different directions, so as to keep the whole in a close compact state, being kept just below the surface of the water, by proper weights applied upon it. It should remain in this steep till the stems become brittle and the bark readily separates, when it must be taken out and spread thinly on a short pasture, being occasionally turned until it becomes perfectly bleached and dry, when it is in a proper state for the purpose of being converted into flax.

The latter, or perennial sort, should be sown in a bed or border of good earth, in shallow drills at the distance of six inches; and when the plants are two or three inches in height they should be thinned to the same distances, and in autumn be planted out in the places where they are to grow. But it is probably a better practice to sow them at once in the places

where they are to grow, thinning them out properly afterwards.

The three other sorts may be best increased by planting cuttings of the branches in pots of light fresh earth, plunging them in the tan hot-bed, or by layers laid down in the later summer months. When the plants in either mode have stricken good root, they may be removed into separate pots, and be managed as other tender exotic plants that require the protection of the green-house.

They may likewise be raised from seeds when they can be procured, which should be sown in pots and placed in a hot-bed in the spring season.

A few plants of the two first sorts may be introduced in the clumps and borders of the pleasure-ground; and the three other sorts afford variety in green-house collections among other potted plants.

LION'S FOOT. See CATANANCHE.

LION'S TAIL. See PHLOMIS.

LIQUIDAMBAR, a genus furnishing plants of the hardy deciduous tree kind.

It belongs to the class and order *Monoclea Polyandria*, and ranks in the natural order of *Coniferae*.

The characters are: that the male flowers are numerous, on a long, conical, loose ament: the calyx a common four-leaved involucre; leaflets ovate, concave, caducous; the alternate ones shorter: there is no corolla: the stamina have numerous filaments, very short, on a body convex on one side, flat on the other: anthers upright, twin, four-furrowed, two-celled: the female flowers at the base of the male spike, heaped into a globe: the calyx an involucre as in the male, but double: perianthium proper bell-shaped, cornered, several, connate, warty: there is no corolla: the pistillum is an oblong germ growing to the perianthium: styles two, awl-shaped: stigmas growing on one side, length of the style, recurved, pubescent: the pericarpium has as many capsules, ovate, one-celled, bivalve at the tip, acute, disposed into a globe, woody: the seeds several, oblong, glossy, with a membrane at the point mixed with a great many chaffy corpuscles.

The species are: 1. *L. styraciflua*, Maple-leaved Liquidambar, or Sweet Gum: 2. *L. imberbe*, Oriental Liquidambar.

In the first, in its native situation, the trunk is commonly two feet in diameter, straight, and free from branches to the height of about fifteen feet; from which the branches spread and rise in a conic form to the height of forty feet and upwards from the ground: the leaves are five-pointed, divided into so many deep sections, (as

sometimes seven,) and set on long slender petioles: they are shaped somewhat like those of the lesser Maple, but of a dark green colour, with their upper surfaces shining: a sweet glutinous substance exudes through their pores in warm weather, which renders them clammy to the touch. In February, before the leaves are formed, the blossoms begin to break forth from the tops of the branches into spikes of yellowish-red, pappose, globular flowers, which swell gradually, retaining their round form, to the full maturity of their seed-vessels, which are thick set with pointed hollow protuberances, and, splitting open, discharge their seeds. It is a native of North America.

In the second species the leaves have their lobes shorter, and much more sinuated on their borders, ending in blunt points, and not serrated. They have also none of those tufts of hair which are found on the leaves of the first sort: its native country is unknown.

Culture.—These plants are increased by seed, and layers.

The seed should be sown as soon as it is procured from abroad, in spring, in a bed of light earth, half an inch deep, when the plants will rise some the same year and others not till the spring following, moderate waterings being occasionally given, keeping them clean from weeds all summer, and protecting them from severe frost the first two winters. When two years old, plant them out in spring, in nursery rows, two feet asunder, to remain three or four years, or till wanted for planting out in the shrubbery, or other places.

Some sow the seeds in pots, or boxes, in order to move them to different situations as the season requires; and that when the plants do not come up the same year, the pots may be plunged in a hot-bed in the following spring to forward their rising.

The layers should be made from the young shoots of the preceding summer, by slit-laying, when most of them will be rooted by the following autumn, though in a dry poor soil they are sometimes two years before they are sufficiently rooted for being removed to plant out.

These trees have great merit for ornamenting shrubbery plantations, in assemblage with others of similar growths, being handsome, straight-growing trees, with fine heads, as well as adapted for planting, detached as single objects, in spacious short grass openings, in which they appear very ornamental, perfuming the air all round in summer.

They succeed in any common soil and situation, and endure the severest cold without injury. They are usually kept in the nurseries for sale.

LIQUORICE. See GLYCYRRHIZA.

LIRIODENDRUM, a genus containing a plant of the hardy deciduous ornamental tree kind.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Coadunatæ*.

The characters are: that the calyx is a proper two-leaved involucre: the leaflets triangular, flat, deciduous: perianthium three-leaved: leaflets oblong, concave, spreading, petal-form, deciduous: the corolla six-petalled, bell-shaped: petals spatulate, obtuse, channelled at the base; the three exterior deciduous: the stamina have numerous filaments, shorter than the corolla, linear, inserted into the receptacle of the fructification: anthers linear, growing longitudinally to the sides of the filament: the pistillum has numerous germs, disposed into a cone: style none: stigma to each globose: there is no pericarpium: seeds imbricated into a body resembling a strobile: the seeds numerous, ending in a lanceolate scale, emitting an acute angle towards the base of the scale from the inner side, compressed at the base, acute.

The species cultivated is: *L. tulipifera*, Common Tulip-Tree.

It has the young shoots covered with a smooth purplish bark; they are garnished with large leaves, whose foot-stalks are four inches long; they are ranged alternate; the leaves are of a singular form, being divided into three lobes; the middle lobe is blunt and hollowed at the point, appearing as if it had been cut with scissors: the two side lobes are rounded, and end in blunt points: the leaves are from four to five inches broad near their base, and about four inches long from the foot-stalk to the point, having a strong midrib, which is formed by the prolongation of the foot-stalk: from the midrib run many transverse veins to the borders, which ramify into several smaller: the upper surface of the leaves is smooth, and of a lucid green, the under is of a pale green: the flowers are produced at the end of the branches; they are composed of six petals, three without, and three within, which form a sort of bell-shaped flower, whence the name: these petals are marked with green, yellow, and red spots, making a fine appearance when the trees are well charged with flowers: the time of flowering is in July; and when the flowers drop, the germ swells, and forms a kind of cone, which does not ripen in this climate. It is a native of North America.

It grows so large as to be a tree of the first magnitude in its native situation, and is generally known by the title of poplar: of late

here have been great numbers raised from seeds here, so that they are become common in the nurseries; and there are many of the trees in different parts which annually produce flowers.

Culture.—This plant may be increased by sowing the seeds, imported annually from America by the seed-dealers, in spring, either in the full ground, in beds of rich light earth, in a warm situation, placing the seed length-wise, and covering it nearly an inch deep, or in pots or boxes, plunging them in a gentle hot-bed: when the young plants appear they should be well screened from the sun, and have free air. They usually come up the same season; when in the former method water should be given them in dry weather; and if the bed be arched over with hoops, to have occasional shade from the mid-day sun in scorching weather, it will be beneficial to the germination of the seeds and growth of the young plants; continuing the waterings with care occasionally during the summer; and in winter, sheltering them with mats in frosty weather to preserve their tops, which are sometimes a little tender the first year, and apt to suffer.

When the plants are two years old, they should be set out in spring in nursery-rows, two feet distant, and a foot asunder in the rows; to remain a few years, till from three to six or eight feet high, when they may be planted where they are to remain.

They are raised best in the open ground, where the beds are prepared of good mellow rich earth, blended with old rotten cow-dung, sifting over the seeds fine turf-mould, mixed with fine sea or pit-sand.

These trees succeed best afterwards in a light soil, not too dry. They should have their roots and branches as little pruned as possible.

They are highly ornamental in large plantations, among others of similar growth, and have a fine effect when planted out singly in large openings, kept in short grass, in pleasure-grounds.

LOBELIA, a genus containing plants of the herbaceous and under shrubby perennial kind.

It belongs to the class and order *Syngenesia Monogamia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a one-leaved perianthium, five-cleft, very small: growing round the germ, withering: toothlets nearly equal: the two superior ones looking more upward: the corolla one-petalled, irregular: tube cylindric, longer than the calyx, divided longitudinally above: border five-parted, divisions lanceolate; of which the two superior ones are smaller, less reflex, more deeply divided, constituting an upper lip: the three inferior ones

more spreading, frequently larger: the stamina have five awl-shaped filaments, the length of the tube of the petal, connate above: anthers connate into an oblong cylinder, gaping five ways at the base: the pistillum is a sharp-pointed, inferior germ: style cylindric, length of the stamens: stigma obtuse, hispid: the pericarpium an ovate capsule, two- or three-celled, two- or three-valved, gaping at the top, girt by the calyx: dissepiments contrary to the valves: the seeds a great many, very small: receptacle conic.

The species cultivated are: 1. *L. cardinalis*, Scarlet Lobelia, or Cardinal's Flower; 2. *L. siphilitica*, Blue Lobelia, or Cardinal Flower; 3. *L. longiflora*, Long-flowered Lobelia; 4. *L. pinifolia*, Pine-leaved Lobelia; 5. *L. inflata*, Bladder-podded Lobelia.

In the first, the root is composed of many white fleshy fibres: the lower leaves are oblong, and of a dark purplish colour on their upper side: the stalks are erect, about a foot and half high, with leaves about three inches long, and an inch and half broad in the middle, on very short petioles and placed alternately: the stalk is terminated by a spike (raceme) of flowers, of an exceeding beautiful scarlet colour; they have a pretty long tube, which is a little incurved, and at the top they are cut longitudinally into five segments; the two upper, which are the smallest, are greatly reflexed; the three under, which form the lower lip, are longer, and spread open. They appear at the end of July and in August, when they make a fine appearance for a month or more, and when the autumn proves favourable produce good seeds. It grows naturally in North America.

The second species has a perennial root: the stem simple, from a foot to two feet in height, and upwards, strong, simple, smooth, with angles formed by the decurrent edges of the leaves having stiffish hairs on them: the leaves are alternate, sessile, somewhat rugged: the flowers axillary, solitary, numerous, large, on short peduncles, forming altogether a long spike of a pale blue colour. It is a native of Virginia, flowering from August to October.

The third is an annual herbaceous elegant plant, seldom above fourteen or sixteen inches in height; the whole of it rough-haired: the stem almost upright, very much branched from all the axils: the leaves are alternate, sessile, subpinnatifid-toothed, sharpish, smooth, half a foot long: the peduncles one-flowered, axillary, solitary, villose. The whole plant is poisonous. It is a native of Jamaica, flowering from June to August.

The fourth species is a shrubby, upright, branched plant, the branches surrounded with



Painted by Syd Edwards.

London Published Apr 1.1806. by G.Kearsley Fleet Street.

Engraved by F. Sanson.

Lobelia Cardinalis.
 1 Scarlet Lobelia or Cardinals flower.

Lilium Candidum.
 2 White Lily.

abundance of narrow sharp leaves an inch in length: the flowers many, small, blue, at the tops of the twigs, among the leaves. It is a native of the Cape of Good Hope.

The fifth is a biennial plant in this climate: the stems channelled, hairy, two feet high: the leaves about two inches long, and one broad in the middle, sessile, light green: flowers small, on long, slender, axillary peduncles, forming a loose spike: the corolla light blue. It flowers in July, and is a native of Virginia, &c.

Culture.—The two first kinds may be increased by seed, cuttings of their stalks, and parting the roots.

The seeds should be sown in autumn, or early in spring, in a warm border, or in pots or boxes, so as to be moved to different situations in different seasons, to have shelter from frost, and shade from the mid-day sun in summer. Those sown in autumn generally come up more freely the following spring than those which are sown in that season. They should have shelter in hard frosts, either under a frame, or awning of mats, but be fully exposed in mild weather, giving occasional waterings in the spring and summer. When the plants have attained two or three inches growth, they should be pricked out in separate small pots of rich earth, giving water, and placing them in the shade till fresh rooted, repeating the waterings occasionally in hot dry weather, and shifting them into larger pots as they may require; in winter moving them into a frame to have occasional shelter from inclement weather; and in the spring following some of them may be turned out into the full ground about March, when they will flower the ensuing summer. Some should also be retained in pots to be moved under shelter in winter, as a reserve in case those in the open air should be killed by frost.

As these plants generally flower in the greatest perfection the first and second year of their blowing, it is proper to raise a supply of new plants every year or two, in order to have them flower in the utmost perfection every year.

The cuttings of the young stalks should be divided into lengths of five or six inches, and be planted in an easterly border, two parts deep, being covered down with hand-glasses, and watered occasionally. They mostly emit roots, and form young plants in a month or six weeks; when the glasses should be taken away, and the plants managed as the others.

These hardy sorts sometimes afford off-sets from their sides at bottom, which may be separated in autumn, and potted for young plants, being managed as the seedlings.

The last three sorts may also be raised by seeds procured from abroad, which should be sown in

pots of light sandy earth in the autumn, and plunged in the bark-bed; and when the plants are three inches high, planted in separate pots, being replunged in the bark-bed, giving water and occasional shade till they are fresh rooted. They must remain constantly in the hot-house, and have frequent moderate waterings given them.

The first two sorts have a fine appearance in the borders and clumps of pleasure-grounds, where they will succeed when protected in winter from frosts.

And the tender sorts afford a fine variety in hot-house collections.

LOBLOLLY BAY. See GORDONIA.

LOCUST-TREE. See CERATONIA.

LOGWOOD. See HÆMATOXYLUM.

LONDON-PRIDE. See SAXIFRAGA.

LONICERA, a genus containing plants of the deciduous flowering shrubby and evergreen kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a five-parted, superior perianthium, small: the corolla one-petalled, tubular: tube oblong, gibbous: border five-parted: divisions revolute, one of which is more deeply separated: the stamina have five awl-shaped filaments, nearly the length of the corolla: anthers oblong: the pistillum is a roundish, inferior germ: style filiform, the length of the corolla: stigma obtuse-headed: the pericarpium is an umbilicated, two-celled berry: the seeds roundish, and compressed.

The species are: 1. *L. nigra*, Black-berried Upright Honeysuckle; 2. *L. Tatarica*, Tartarian Upright Honeysuckle; 3. *L. Xylosteum*, Fly Honeysuckle; 4. *L. Pyrenaica*, Pyrenean Upright Honeysuckle; 5. *L. alpigena*, Red-berried Upright Honeysuckle; 6. *L. cærulea*, Blue-berried Upright Honeysuckle; 7. *L. symphoricarpos*, Shrubby St. Peter's-wort; 8. *L. diervilla*, Yellow-flowered Upright Honeysuckle; 9. *L. periclymenum*, Common Honeysuckle; 10. *L. caprifolium*, Italian Honeysuckle; 11. *L. sempervirens*, Trumpet Honeysuckle; 12. *L. grata*, Evergreen Honeysuckle.

The first is three or four feet in height: the leaves are small, the younger ones hirsute, quite entire, but plaited a little, so as to appear serrate: stipules ovate-lanceolate: bractes two dry scales and three transverse broad leaflets: the peduncles are axillary, slender, an inch long, opposite: the calyx broadish: the corolla purple on the outside, white within, or quite white, pubescent: the berries black, a little oblong, containing three, five, and sometimes ten seeds. It is a native of

France, &c. flowering in March, April, and May.

The second species grows about the same height with the first and sixth sorts, and bears a great resemblance to them in the branches; but the leaves are heart-shaped, and the berries are red, growing sometimes single, at others double, and frequently there are three joined together; they are about the same size with the first sort. It is a native of Russia, flowering in May and June.

It varies with white flowers in shady groves.

The third rises with a strong woody stalk, six or eight feet high, covered with a whitish bark, dividing into many branches: the leaves are ovate, opposite, entire, and covered with a short hairy down, soft, like cloth to the touch: the flowers come out on each side of the branches opposite, on slender peduncles, each sustaining two white flowers standing erect: the three lower segments of the corolla are narrow and reflex, the other two are broader and upright. It is a native of the North of Europe, flowering in May.

The fourth species seldom rises more than three or four feet high, dividing into several spreading irregular branches: the leaves are smooth: the flowers come out from the side of these on slender peduncles, each sustaining two white flowers, which are cut into five segments almost to the bottom. It is a native of the Pyrenean Mountains, flowering in April.

The fifth has a short thick woody stem, which divides into many strong woody branches growing erect: the leaves are petioled, entire, dark green above, but pale underneath: the flowers upon very long slender peduncles, which come out opposite on each side of the branches, at the base of the leaves; they are red on the outside, but pale within, shaped like those of the third sort, but a little larger, and standing erect. They appear at the end of April, and are commonly succeeded by two ovate red berries, joined at the base, and having two punctures. It is a native of the South of Europe.

The sixth species seldom rises more than four or five feet high: the branches are slender, covered with a smooth purplish bark: the joints are distant, where leaves come out opposite, and sometimes there are two on each side: the peduncles are very short, each sustaining two white flowers, succeeded by blue berries single and distinct. The flowers appear in May (March or April), and the berries ripen in August. It is a native of Switzerland.

The seventh is about four feet in height, sending out many slender branches: the leaves are ovate, hairy, opposite, on very short petioles:

the flowers are produced in whorls round the stalk; they are of an herbaceous colour, and appear in August: the fruit, which is hollow, and shaped like a pottage pot, ripens in the winter: the corollas are regular and bell-shaped: the fruit fleshy, globular, the form and size of the flowers of *Arbutus*, four-celled, containing cartilaginous roundish seeds. It is a native of Virginia, &c. flowering in August and September.

The eighth species is a low shrub, seldom rising more than three feet high: the stalks are slender and woody, and have a reddish-coloured bark: the leaves oblong, pointed, slightly serrate, opposite: the flowers small, pale yellow, two or three on each division of the raceme: the berries oval, black, four-celled, with one hard seed in each cell: the roots creep far under ground, and send out many stems: many of these which come up in the spring produce flowers the same year, so that there is generally a succession of them from May to September: the shoots of the former year flowering early, the side branches soon following, and then the young shoots. It is a native of North America.

The ninth trails over bushes, and twines round the boughs of trees, with its very slender hairy (or smooth) branches, which are opposite, and commonly stained with purple, in part at least, or on one side: the leaves opposite, ovate, smooth (or hairy), underneath glaucous, all distinct and more separated from the stem, though even in these there is a slight membranaceous ring running round the branch, and connecting the two opposite leaves: the upper floral leaves are sessile and cordate: the peduncles short, single, or more often triple, covered with glandular hairs, as are also the calyx, and tube of the corolla: the flowers are in a thick roundish whorled spike, many together (from ten or twelve to nineteen or twenty); the tube an inch long, curved a little; the border two-parted, both parts reflex; the upper one divided into four blunt and nearly equal segments, the lower one linear and entire: the tube is wider and shorter, the border much longer than in the tenth sort: the border being turned back, the stamens stand much above the corolla, and the pistil much above them: the corollas are usually red on the outside, and yellowish within, but they vary much in colour, between red, purple, and yellow, and in the shade are very pale: they smell very sweet, especially in the evening. It is a native of most parts of Europe, flowering here from the end of May to July.

The great beauty and exquisite fragrance of the flowers of this plant give it a place in most ornamental plantations. In climbing it turns from east to west, with most of our climbers; and in common with them it bears clipping and

pruning well; for, in a state of nature, those plants that cannot ascend without the assistance of others are often liable to lose large branches; they have therefore a proportional vigour of growth to restore accidental damages. It is subject, when placed near buildings, to be disfigured and injured by *Aphides*, vulgarly termed *Blights*; these insects are not very numerous in spring, but as the summer advances they increase in a surprising degree; their first attacks should of course be watched, and the branches they first appear on be cut off and destroyed, for when they have once gained ground they are defended by their numbers. Small plants may be cleared of them by tobacco dust or Spanish snuff, but this is not practicable for large trees: the leaves are likewise liable to be curled up by a small caterpillar, which produces a beautiful little moth, *Phalaena Tortrix*. In the evening some species of *Sphinxes* or Hawk-Moths are also frequently seen to hover over the blossoms, and with their long tongues to extract the honey from the very bottom of the flowers.

There are several varieties; as the Late Red, which produces a greater quantity of flowers together than either the Italian or Dutch sorts, making a finer appearance than either of them during the time of flowering; but it has not been so long cultivated as the latter.

It was formerly termed Flemish Honeysuckle. There are also sometimes varieties with striped leaves.

The Dutch variety may be trained with stems, and formed into heads, which the wild sort cannot, the branches being too weak and trailing for the purpose: the branches of this are smooth, of a purplish colour, garnished with oblong oval leaves, three inches long, and an inch and three quarters broad, of a lucid green on their upper side, but pale on their under, having very short foot-stalks; they are placed by pairs, but are not joined at their base: the flowers are produced in bunches at the end of the branches, each flower arising out of a scaly cover, which, after the flowers fade, forms an oval head, whose scales lie over each other like those of fish: the flowers are of a reddish colour on their outside, and yellowish within, of a very agreeable odour. It flowers in June, July, and August.

There are two sub-varieties of it, the Long Blowing and the Late Red.

The stems are stronger, the leaves, flowers, and heads of berries larger, and the corollas redder than in the Woodbine sort.

The Oak-leaved variety has sinuate leaves, cut like the oak, and smooth.

There is likewise a variety with variegated leaves.

In the tenth species the branches are slender, covered with a light green bark, and garnished with oval leaves of a thin texture, placed by pairs, sitting close to the branches; but those which are situated towards the end of the branches join at their base, so that the stalk seems as if it came through the leaves: the flowers are produced in whorled bunches at the ends of the branches; are white, and have a very fragrant odour, but of short duration, so that in about a fortnight they are entirely over; and soon after the leaves appear as if blighted and sickly, making an indifferent appearance the whole summer, which has rendered them less valued than the others. It flowers in May, and is a native of the South of Europe.

The variety which is the next in succession to the white, is the yellow, in which the shoots are much like those of the former, but have a darker bark: the leaves are also of a deeper green; the flowers of a yellowish red, and appear soon after the white; they are not of much longer duration, and are succeeded by red berries, containing one hard seed inclosed in a soft pulp, which ripens in the autumn.

Besides this, some mention other varieties, as the early red-flowering, the late red-flowering, and the evergreen red-flowering.

The eleventh grows naturally in Virginia, and many other parts of North America, but has been long cultivated in gardens by the title of Virginia Trumpet Honeysuckle. Martyn remarks, that of this there are two varieties, if not distinct species, one being much hardier than the other. The old sort, which came from Virginia, has stronger shoots; the leaves are of a brighter green; the bunches of flowers larger, and deeper coloured than in the other which came from Carolina. These plants have the appearance of the ninth sort, but the shoots are weaker than any of those, except the wild sort called Woodbine; they are of a purplish red colour, and smooth: the leaves are of an oblong oval shape inverted, and closely surrounding the stalk; of a lucid green on their upper side, but pale on their under: the flowers are produced in bunches at the end of the branches; these have long slender tubes, which are enlarged at the top, where they are cut into five almost equal segments: the outside of the flower is of a bright scarlet, and the inside yellow; they have a great appearance of the Honeysuckle, but are not so deeply divided, nor are the segments reflexed. They have no odour, but are cultivated for the beauty and long continuance of their flowers.

and their evergreen leaves. It flowers from May to August.

The twelfth species has strong branches, covered with a purple bark, which are garnished with lucid green leaves embracing the stalks, and continuing their verdure all the year: the flowers are produced in whorled bunches at the ends of the branches; there are frequently two and sometimes three of these bunches rising one out of another; they are of a bright red on their outside, and yellow within, of a strong aromatic flavour. This sort begins to flower in June, and there is a succession of flowers till the frost puts a stop to them, so that it is the most valuable of all sorts. It is a native of North America.

Culture.—All the sorts may be increased either by layers or cuttings, but the latter is the better practice. The layers should be made from the young shoots, and be laid down in the autumn or early spring, the straggling tops being removed, when by the following autumn they will have taken root, and should be cut off from the plants, being either planted where they are to remain, or into a nursery to be trained for standards, by fixing down stakes to the stem of each plant, to which the principal stalk should be fastened, all the others being cut off; training it to the intended height, when it should be shortened to force out lateral branches, and these be again stopped to prevent their growing too long. By constantly repeating this as the shoots are produced, they may be formed into a sort of standard; but if regard is had to their flowering, they cannot be formed into regular heads, as the constant shortening will destroy the flower-buds.

The cuttings should be taken from the strong shoots of the former summer, with three or four joints, and be planted in rows in a shady border, to the depth of two or three of them, a foot apart, and six inches from plant to plant. When they have taken good root in the autumn or spring following, they may be removed into the nursery, and be planted out in rows two feet distant, and a foot asunder in them, where they may be kept a year or two, till wanted for planting out where they are to remain.

The eighth sort may be raised from suckers, which it affords in plenty, by taking them off and planting them as above in the autumn in a rather moist soil.

Several of the sorts may likewise be increased by sowing the seed or berry in a bed of light mould in the autumn, to the depth of an inch. The plants rise in the first or second spring; and afterwards require the same management as the others.

The only culture which any of the sorts afterwards require is, in the upright sorts, to have their straggling shoots shortened, and the dead wood cut out; and those trained as climbers, to have their branches conducted in a proper manner upon their respective supports; and every year all rambling shoots reduced and trained as may be proper, so as to preserve them within due limits and order, except designed to run wild in their own rural way, especially those intended to climb among the branches of trees, shrubs, and bushes; those also intended to cover arbours and seats should be pruned and trained annually, laying the shoots along at their length, till they have covered the allotted space; shortening or clearing out all such stragglers as cannot be properly trained: also such of those sorts as are trained against walls, &c. must have an annual pruning and training, by going over them two or three times in summer, laying in some of the most convenient proper shoots, some at their length, shortening or retrenching others as necessary to preserve regularity, and the proper succession of flowers; being careful to train enough, at this time, of such as appear necessary to continue the bloom as long as possible; and in winter-pruning, all those left in summer, which may appear superfluous or unnecessary, should be turned out, shortening all such as are too long for the space allotted for them, especially all those with weak straggling tops, nailing in the remaining proper branches and shoots close to the wall, or other support.

They are all proper for plantations, both from the variety of their different growths, and the ornament and fragrance of their flowers; though the flowers of the upright kinds are not so showy as those of the trailers; but they exhibit an exceedingly agreeable variety.

The trailing species have, however, the greatest merit, not only in their numbers, but size, elegance, and odour, as well as in duration. The shrubs of all the sorts are, notwithstanding, proper to be introduced in shrubberies, the upright kinds to intermix as standards. The trailing kinds, whose branches are great ramblers, and, without support, trail along the ground, should generally be introduced as climbers, having stout stakes placed to each for them to climb upon, which they effect by ascending spirally round the support, to a considerable height; and also be placed to ascend round the stems of trees, and to climb among the boughs of the adjacent bushes, shrubs, and hedges, which they effect in a very agreeable manner, by interweaving their branches with them.

The climbers are likewise proper for training

against walls and arbours, &c., for the ornament and fragrance of their flowers, laying their branches in four or five inches asunder; thinning out the superabundant shoots annually, and training in some of the most robust for succession wood, either at full length, or shortened as most proper to fill the space.

The evergreen kinds are principally of the climbing tribe, and have much effect in their evergreen foliage and the elegance of their flowers, as well as in their long continuance in blow.

LOOKING-GLASS PLANT. See **HERITIERA**.

LOOSE-STRIPE. See **ANAGALLIS**.

LOPPING TREES, the practice of cutting off the boughs or branches of pollard or other trees. This work should be done with great care and attention, so as to prevent the decay of the trees.

Lopping of trees, at ten or twelve years growth, is said to preserve them much longer, and occasion the shoots to grow more into wood in one year than they do in old tops in two or three. When great boughs are ill taken off, it often spoils the trees; they should therefore always be spared, unless there is an absolute necessity. When they must be cut off, it should be close and smooth, and not parallel to the horizon, covering the wound with loam and horse-dung mixed, or some of Mr. Forsyth's composition, to prevent the wet from entering the bodies of the trees and destroying them.

There are various signs of the decay of trees; as, the withering or dying of their top branches; the wet entering at a knot; their being hollow, or discoloured; their making but poor shoots, and woodpeckers making holes in them.

Nothing is more injurious to the growth of timber-trees, than that of lopping or cutting off the great branches from them; as they grow better without it, and do not decay so soon.

The dead branches should however be removed.

The proper seasons for this sort of business, are the very early autumn and spring months.

All sorts of resinous trees, or such as abound with a milky juice, should be lopped very sparingly, as they are subject to decay when often lopped. The best season for lopping these trees is the latter end of summer or beginning of autumn; they then seldom bleed much, and the wounds are commonly healed over before the cold weather sets in.

Few sorts of ornamental trees should be much lopped, as it greatly injures their beauty and appearance. The only thing necessary, is to take off such straggling branches as may grow

VOL. II.

in an awkward or improper direction. See **PRUNING OF TREES**.

This sort of work is mostly performed with a saw, hedging-bill, or ax.

LORANTHUS, a genus containing a plant of the exotic kind for the stove.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx has the perianthium of the fruit inferior: margin entire, concave; of the flower superior, or the margin entire, concave: the corolla has six, oblong petals, revolute, equal: the stamina have six awl-shaped filaments, fastened to the bases of the petals, the length of the corolla: anthers oblong: the pistillum is an oblong germ, between the two calyxes, or inferior: style simple, the length of the stamens: stigma blunt: the pericarpium is an oblong berry, one-celled: the seed oblong.

The species cultivated is *L. Americanus*, American Loranthus.

Its branches are subdivided, leafy, smooth, pale green, brittle: the leaves petioled, opposite, entire, subcoriaceous, nerved, and pale: the petioles short, compressed, smooth: the racemes subdivided, terminating, with three-cornered branchlets; the last pedicels trifid, one-flowered: the flowers red.

It ramps over the highest trees in Jamaica, &c., especially the *Coccoloba grandifolia*, with the root adhering firmly to the bark like *Mistletoe*.

Culture.—This plant may be increased by sowing the seeds as soon as they are fully ripened, in pots of light rich earth, being kept in a mild hot-bed until the beginning of the autumn, when they must be plunged in the bark hot-bed of the stove, being afterwards treated as other tender plants of the same kind.

It affords variety in stove collections.

LORDS AND-LADIES. See **ARUM**.

LOTE-TREE. See **CELTIS**.

LOTUS, a genus containing plants of the herbaceous and under-shrubby kind.

It belongs to the class and order *Diadelphica Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a simple umbel: perianthium one-leafed, tubular, half-five-cleft: teeth acute, equal, erect, permanent: the corolla papilionaceous: banner roundish, bent down; claw oblong, concave: wings roundish, shorter than the banner, broad, converging upwards: keel gibbous below, closed above, acuminate, ascending, short: the stamina have diadelphous filaments, simple and nine-cleft, ascending, with broadish tips: anthers small, simple: the

L

pistillum is a columnar germ, oblong : style simple, ascending : stigma an inflected point : the pericarpium is a legume cylindric, stiff and straight, stuffed, longer than the calyx, many-celled, two-valved : the seeds several and cylindric.

The species cultivated are : 1. *L. tetragonolobos*, Winged Bird's-foot Trefoil ; 2. *L. jacobaeus*, Dark-flowered Bird's-foot Trefoil ; 3. *L. creticus*, Silvery Bird's-foot Trefoil ; 4. *L. hirsutus*, Hairy Bird's-foot Trefoil ; 5. *L. Dorycnium*, Shrubby Bird's-foot Trefoil.

The first has an annual root : the stems several, decumbent, upright, about a foot long, having at each joint a ternate leaf : the leaflets ovate : the stipules of the same shape : peduncles axillary, alternate, from two to three inches long, each sustaining one (sometimes two) large red flowers at the top, with three leaves just under the flower. The wings are very dark purple, appearing to be black at the end : the legume thick, with four broad undulating wings : the seeds sub-globular, the size of a small pea, smooth, pale or livid purple, without spots. It flowers in June and July, and the seeds ripen in autumn. It is a native of Sicily.

It was formerly cultivated as an esculent plant, for the green pods, which are said to be still eaten in some of our northern counties, but they are very coarse. It is now chiefly cultivated in flower-gardens for ornament.

The second species has a slender woody stem, from two to three feet high, sending out many slender herbaceous branches : the leaves sessile, hoary : leaflets narrow, white : the flowers axillary from the upper part of the stem, four or five, on very slender peduncles, of a yellowish deep purple colour : the pods taper, slender, little more than an inch long, containing five or six small roundish seeds. It is a native of the Cape Verd Islands, flowering all the summer and autumn, and many times a great part of the winter.

The third species rises with slender stems which require support, from three to four feet high, sending out a few side branches. At each joint is a neat silvery ternate leaf, with two appendages or stipules : the peduncles axillary, from two to three inches long, sustaining heads of yellow flowers, which part in the middle, each head containing four or six flowers : these appear in May, June, and July, and are succeeded by long taper pods filled with roundish seeds, which ripen in the autumn. It is a native of Spain and the Levant.

The fourth species has a perennial stalk three feet high : when the roots are large, they fre-

quently send up several of these stalks, especially if the old ones be cut down : they are hairy, and divide into several branches : the leaves are ternate, hoary, with two stipules : the flowers in heads on long axillary peduncles : the calyxes very hairy : the corollas dirty white, with a few marks of pale red : the pods short, thick, chestnut-coloured, containing several roundish seeds. It is a native of the South of Europe, flowering from June to August.

The fifth species rises with weak shrubby stalks three or four feet high, sending out many slender branches, thinly set with small hoary leaves, having five leaflets, spreading like the fingers, and sessile : the flowers at the extremity of the branches in small heads. They are very small and white, appear at the end of June, or in July, continue to September, and are succeeded by short pods, containing two or three small round seeds. It is a native of the South of Europe.

Culture.—The first sort is raised by sowing the seed annually in spring, in the open ground, in the places where the plants are to remain, in patches in different parts, of five or six seeds in each, half an inch deep. The plants soon come up, which, remaining in the same place for flowering, require only occasional weeding, being either suffered to trail, according to their natural growth, or tied up to sticks.

The other sorts may be increased by seeds and cuttings.

The seeds should be sown in pots of light earth or in a moderate hot-bed ; and when the plants are about three inches high be planted out in separate small pots of light rich earth, giving water, and placing them in the shade till fresh-rooted.

The cuttings of the young stalks and branches may be planted any time in the spring or summer, in beds or pots of rich mould, giving shade and water. They emit roots, and form plants in a few weeks, but may be greatly facilitated by covering them close with hand-glasses till they begin to shoot at top ; then they should be gradually inured to the air, and soon after be transplanted into separate pots.

The young green seed-pods of the first sort were formerly dressed and eaten as peas, or in the manner of kidney-beans.

The other kinds effect an agreeable variety in collections of green-house plants, both in their foliage and flowers. They all require shelter from frost, the two first in particular ; the two last are somewhat hardier, and sometimes succeed in the full ground all the year, in warm dry situations. A few plants should however con-

stantly be kept in the pots, to be protected in the winter season.

LOVAGE. See *LIGUSTICUM*.

LOVE-APPLE. See *SOLANUM LYCOPERSICUM*.

LOVE-LIES-BLEEDING. See *AMARANTHUS CORDATUS*.

LUNARIA, a genus containing plants of the herbaceous annual and perennial kinds.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliculosæ* or *Cruciformes*.

The characters are: that the calyx is a four-leaved perianthium, oblong: leaflets ovate-oblong, blunt, converging, deciduous, of which the two alternate ones are gibbous and bagged at the base: the corolla four-petalled, cruciform: the petals entire, blunt, large, the length of the calyx, ending in claws of the same length: the stamina have six awl-shaped filaments; four the length of the calyx, two a little shorter: anthers from upright, spreading: the pistillum is a pedicelled germ, ovate-oblong: style short: stigma blunt, entire: the pericarpium is an elliptic silicle, flat, entire, upright, very large, pedicelled, terminated by the style, two-celled, two-valved: partition parallel and equal to the valves, flat: the seeds some kidney-shaped, compressed, marginal, in the middle of the silicle: the receptacles filiform, long, inserted into the lateral sutures.

The species cultivated are: 1. *L. rediviva*, Perennial Honesty; 2. *L. annua*, Annual Honesty, Moor-wort, or Satin-flower; 3. *L. Ægyptiaca*, Egyptian Honesty.

The first is a very large plant: the root is perennial, white: stem from three to four feet high, upright, simple, channelled, green tinged with purple, hirsute: the lower leaves opposite; upper alternate, on long petioles, smooth or rough-haired, cordate, unequally serrate, nerved, acuminate, near a span long, and three or four inches wide: the flowers terminating, on long slender peduncles, often bifid and trifid, of a white purple colour, and odorous. They have two glands on each side between the longer stamens and the style, and one between the style and each shorter stamen, which accounts for the bagging of the perianthium. It is a native of the South of France, &c.

The second species has a biennial, knobbed root: the stem smaller than the first; upright, branched, hirsute, round, half a yard high: the leaves are rough haired, the floral ones almost always opposite, sessile: stem-leaves petioled, much smaller than those of the first sort, cordate, dull green, and serrate: the flowers are of a purplish violet or blue-purple colour, and inodorous.

It is a native of Germany. Both these species flower in May and June.

The seed-vessels, when fully ripe, become transparent, and of a clear shining white like satin; whence the name of Satin-flower.

The third is an annual plant, with a smooth branching stalk little more than a foot high: the leaves are unequally pinnate: leaflets differing in size and form; some almost entire, others cut at their extremities into three parts; they are smooth, and of a lucid green: the flowers stand each upon pretty long slender peduncles, which come out from the side, and also at the end of the branches, in loose small clusters; they are of a purple colour, and are succeeded by oblong compressed pods, which hang downward, and when ripe are of a feuillet-mort colour. It is a native of Egypt, flowering here, in June and July.

Culture.—These plants may be raised by sowing the seed in a shady border, or, which is better, in patches in the situations where they are to remain, in the autumn, keeping the plants afterwards properly thinned out and free from weeds. They may likewise be sown in the early spring; but the former is the better season, as the plants rise stronger. The last sort should have an open situation. When sown in beds, the perennial sort should be set out where they are to remain, in the following autumn after being sown.

They all afford ornament and variety in the borders and clumps of pleasure-grounds, in which the first sort should be placed more backward.

LUPINUS, a genus containing plants of the hardy herbaceous annual and perennial flowery kinds.

It belongs to the class and order *Diadelphina Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianthium, bifid: the corolla papilionaceous: banner cordate-roundish, emarginate, bent back at the sides, compressed: wing subovate, almost the length of the banner, not fastened to the keel, converging below: keel two-parted at the base, sickle-shaped upwards, acuminate, entire, the length of the wings, narrower: the stamina have ten filaments, united, somewhat ascending, distinct above: anthers five, roundish, and as many oblong: the pistillum is an awl-shaped germ, compressed, villose: style awl-shaped, ascending: stigma terminating, blunt: the pericarpium is a large legume, oblong, coriaceous, compressed, acuminate, one-celled: the seeds several, roundish and compressed.

The species cultivated are: 1. *L. albus*, White Lupine; 2. *L. varius*, Small Blue Lupine; 3. *L. angustifolius*, Narrow-leaved Blue Lupine; 4. *L. hirsutus*, Great Blue Lupine; 5. *L. luteus*, Yellow Lupine; 6. *L. perennis*, Perennial Lupine.

The first has a thick upright stalk about two feet high, dividing towards the top into several smaller hairy branches: the leaves are digitate, composed of seven or eight narrow oblong leaflets, joining at the base; they are hairy, of a dark grayish colour, and have a silvery down: the flowers are produced in loose spikes at the end of the branches; they are white and sessile: the legumes are straight, hairy, about three inches long, containing five or six seeds, which are roundish, flattened like a lens, extremely smooth and even, perfectly white without any spots, smaller than most of the others. It flowers in July, and the seeds ripen in the autumn: growing naturally in the Levant.

The second species is an annual plant, with a firm, straight, channelled stalk near three feet high, divided towards the top into several branches: the leaves are digitate, composed of five, six, or seven oblong or linear leaflets, which join at their base, and are hairy: the flowers are produced in spikes at the end of the branches, standing round the stalk in half whorls; they are of a light blue colour. It is a native of the South of France, &c. flowering in July.

The third has much the appearance of the second sort, but the stalks rise higher: the leaves have more leaflets, and stand upon longer foot-stalks: the leaflets are blunt: the seeds are variegated; and, according to Linnæus, they are linear, and the flowers blue. Ray describes it as more upright, and much taller, being eighteen inches high, and as tall as the first. It is a native of Spain, &c.

The fourth species is also an annual plant, which rises with a strong firm channelled stalk, from three to four feet high, covered with a soft brownish down, dividing upward into several strong branches, garnished with digitate leaves, composed of nine, ten, or eleven wedge-shaped hairy leaflets, which are narrow at their base, where they join the foot-stalk, but enlarge upward, and are rounded at the top, where they are broadest: the foot-stalks of the leaves are three or four inches long: the flowers are placed in whorls round the stalks above each other, forming a loose spike, which proceeds from the end of the branches; are large, and of a beautiful blue colour, but have no scent: they appear in July, and the seeds ripen in autumn: the pods are large, almost an inch broad, and

three inches long; inclosing three large roundish seeds, compressed on their sides, very rough and of a purplish brown colour. It is a native of the South of Europe.

There is a variety with flesh-coloured flowers, commonly called *Rose Lupine*.

The fifth has a stem a foot high, branching: the leaves are digitate, composed of seven, eight, or nine narrow hairy leaflets, nearly two inches long: the flowers are yellow, odorous, in loose spikes at the end of the branches, composed of several (six or seven) whorls, with spaces between them, and about five flowers in each, terminated by three or four flowers, sitting close at the top; these are succeeded by ovate flattish hairy pods, about two inches long, standing erect, and inclosing three, four, or five roundish seeds, a little compressed, yellowish white, variegated with dark spots. It is a native of Sicily, flowering in June and July.

The sixth has a perennial creeping root, from which arise several erect channelled stalks a foot and a half high, sending out two or three small side branches, garnished with digitate leaves, composed of from five to ten or eleven narrow spear-shaped leaflets, which join at their base, and stand upon very long foot-stalks, having a few hairs on their edges: the flowers grow in long loose spikes, which terminate the stalks, and are placed without order on each side; they are of a pale blue colour, and on short peduncles; appearing in June, and the seeds ripening in August, which are soon scattered if they are not gathered when ripe; for, after a little moisture, the sun causes the pods to open with elasticity, and cast out the seeds to a distance. It is a native of Virginia.

Culture.—These plants may be readily raised by sowing the seeds in patches in the borders, with other annuals in the spring, where they are to remain; thinning them afterwards where they are too close, and keeping them clean from weeds. In order to have a succession of flowers, they should be sown at different times, as in April, May, and June. The seed of those only which are first sown ripens well.

In order to have good seed of the fourth kind, some seeds should be sown on a sunny border under a wall, or in pots placed under frames, the plants in the latter case being turned out and planted with balls of earth about them in the spring.

They are all useful plants for producing variety, in the borders, clumps, and other parts. The last sort should be sown at many different times.

LUXURIANT PLANTS, a term in gardening; signifying such as become greatly aug-

mented in growth beyond their common natural state, and which rarely acquire that degree of perfection which is the case with those of more moderate growths. This sometimes happens from excess of nourishment, and sometimes from the nature of the plants.

It is produced differently; sometimes prevailing in the whole plant, sometimes in particular parts, as in some of the shoots, and frequently in the flowers.

The first may be considered such as shoot much stronger than plants of the same species generally do, and happens both in herbaceous plants and trees, &c. which never attain perfection so soon as the more moderate growers: thus many sorts of esculent plants which shoot luxuriantly to leaves and stalks, &c. as cucumbers, melons, cabbages, cauliflowers, turnips, radishes, beans, peas, &c., never arrive so soon to perfection as those of moderate growth; and such plants as appear to be naturally of themselves of a very luxuriant nature, are very improper to stand, from which to save seed for future increase.

This is also the case in fruit-trees; as such as are very luxuriant shooters are much longer before they attain a bearing state than those of middling growth; and they never bear so plentifully, or have the fruit attain such perfection. This luxuriance is frequently acquired by unskilful pruning, especially in wall-trees, &c., as it is often the practice, when wall or espalier trees assume such a growth, to cut all the shoots short; by which, instead of reducing the tree to a moderate state of shooting, it has its vigour increased, as too considerable shortening of strong shoots promotes their throwing out still stronger, and producing more abundant or superfluous wood. Therefore, in pruning very luxuriant espalier and wall-fruit trees, they should be assisted somewhat in their own way, as it were, by training in plenty of shoots annually for a year or two, to divide the redundancy of sap; or in the summer and winter prunings, always leaving them rather thicker than in the common practice, and mostly at full length, unless it be necessary to shorten such as are of very considerable length, or in some particular part of the tree, to force out a supply of wood to fill a vacancy. Some sorts of fruit-trees should indeed never be generally shortened in the common course of pruning, except in casual very extended irregular growths, or occasionally for procuring a supply of wood as mentioned above. This is particularly necessary in apples, pears, plums, cherries, and fig-trees; for, if general shortening was to be practised in these sorts, they would continue shooting every year so luxuriantly to wood, that

they would never form themselves into a proper bearing state: even in those trees where shortening is necessarily practised in winter, in most of the annual supplies of shoots, as in peaches, nectarines, &c., in cases of luxuriant growth, it should be very sparingly performed, the general shoots not being cut very short, and some of the most vigorous left almost or quite at the full length.

This is the proper method to reduce luxuriant trees to a moderate growth, and to a bearing state; as by training the shoots thicker, and leaving them longer, and continuing it for a year or two, the redundant sap having greater scope to divide itself, cannot break out with that luxuriance, as when it has not half the quantity of wood to supply with nourishment, as in the case of short pruning. See *ESPALIER, WALL-TREES, and PRUNING.*

This state seldom occurs with any continuance in standard-trees, where permitted to take their natural growth, except in casual straggling shoots, which should always be taken out.

Over luxuriant shoots are mostly met with in trees and shrubs; but require more particularly to be attended to in the culture of the fruit tree kind, especially those of the wall and espalier sort, which undergo annual pruning.

They are such as shoot so vigorously in length and substance, as greatly to exceed the general growth of those usually produced on the same kind of plant or tree, and are sometimes general, but in other cases only happen to particular shoots in different parts of a tree, &c. They are discoverable by their extraordinary length and thickness, and by their vigour of growth, which always greatly impoverishes the other more moderate shoots in their neighbourhood, and likewise the fruit, &c., as well as often occasions a very irregular growth in the respective trees. Such shoots frequently occur in wall and espalier fruit-trees, and are the effects of injudicious pruning. When they are in general wholly so, they should be managed as directed above; but when only in particular shoots here and there in a fruit or other tree or shrub under training, such shoots being of such a very luxuriant nature as to draw away the nourishment, at the expense of the adjacent moderate shoots, and which, by their vigorous irregular growth, cannot be trained with any degree of regularity; they should for the most part, as soon as discoverable, in the summer or winter prunings, be cut out, taking them off as close as possible to the part of the branch whence they originate, that no eye may be left to shoot again; unless such a shoot should rise in any part of a tree or shrub, where a further

supply of wood may be requisite; in which case it may be retained, and shortened as convenient, to force out a supply of more shoots laterally to fill the vacancy.

When it prevails in other trees and shrubs than those of the fruit kind, they should have occasional attention, pruning them in regular order in their younger advancing growth, or afterwards occasionally in particular sorts, as may be necessary; observing, in either, when any straggling shoots, &c. assume a very luxuriant rambling growth, greatly exceeding the other general branches, that they be more or less reduced, or cut entirely away close to their origin, as may be most expedient, according to the nature of growth of the trees or shrubs, either in summer or winter, &c.

Most double flowers may be considered as luxuriant, especially such as have the cup or corolla multiplied, or so augmented in the number of their leaves, or flower-petals, inward, as to exclude some part of the fructification, as the same thing occurs in flowers as in esculent plants and fruit-trees, from their over luxuriant growth; for, as the flower is designed for perfecting the fruit and seed, when the petals are multiplied to the diminution of the stamina, &c. no impregnation ensues, and of course no fruit or seed is produced.

In the double varieties of most kinds of flowers produced on ornamental flowering plants, this luxuriance is generally considered as a superior degree of perfection; and has different modifications.

The highest degree of this sort of luxuriance is met with in carnations, anemones, ranunculuses, the poppy, lychnis, peony, narcissus, violet, and some others.

LYCHNIS, a genus containing plants of the hardy, herbaceous, flowery, perennial kind.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a one-leaved perianthium, oblong, membranaceous, five-toothed, permanent: the corolla has five petals: claws the length of the calyx, flat, margined: border often cloven, flat: the stamina have ten filaments, longer than the calyx, alternately shorter, each of these fixed to a claw of each petal: anthers incumbent: the pistillum is a subovate germ: styles five, awl-shaped, longer than the stamens: stigmas reflex against the sun, pubescent: the pericarpium is a capsule approaching to an ovate form, covered, one-, three-, or five-celled, five-valved: the seeds very many, and roundish.

The species cultivated are: 1. *L. chalcedonica*, Scarlet Lychnis; 2. *L. Flos cuculi*, Red-flower-

ed Lychnis, Meadow Pink, or Ragged Robin; 3. *L. coronata*, Chinese Lychnis; 4. *L. viscaria*, Viscous Lychnis, or Catchfly; 5. *L. diurna*, Rose-flowered Lychnis, Wild Red Campion, or Red Bachelor's Buttons; 6. *L. vespertina*, White-flowered Lychnis, Wild White Campion, or White Bachelor's Buttons.

The first has a perennial root: the stems three feet high, upright, stiff, round, jointed, hairy: at every joint are two large leaves of a brownish green colour: the flowers terminating in a large flat-topped tuft, consisting of several bundles: the corolla is of a scarlet or bright red orange colour, varying to white, blush, and variable, that is, pale red, growing paler till it becomes almost white. It is a native of Russia, &c.

Besides its varying as above, there is a variety with very double flowers of a beautiful scarlet colour: it has a perennial root, from which arise two, three, or four stalks, according to the strength of the roots, which in rich moist land grow upwards of four feet high; the stalks are strong, erect, and hairy, being garnished the whole length with spear-shaped leaves sitting close to the stalks, placed opposite; and just above each pair of leaves there are four smaller leaves standing round the stalk: the flowers are produced in close clusters sitting upon the top of the stalk: when the roots are strong, the clusters of flowers are very large, and make a fine appearance, coming out the latter end of June, and in moderate seasons continue near a month in beauty. The stalks decay in autumn, and new ones arise in the spring following.

The second has also a perennial root, brownish white, subacrid: the stems from one to three feet high, upright, somewhat angular and grooved, swelled at the joints, purplish: they are procumbent, and become upright at the time of flowering: the stem-leaves opposite, connate, lanceolate, keeled, upright, smooth: the peduncles opposite, with one generally between them: the calyx ten-angled, of a deep purple colour: the corolla pink or purplish red, varying sometimes to white: the border of the petals dividing into four segments, of which the two outer are shorter and narrower: the claws have two small spear-shaped teeth at the top: the capsule one-celled, the mouth having five teeth which turn back: the seeds flattish, rugged, of a brown ash-colour. It is a native of most parts of Europe, flowering in May and June.

In the third the whole plant is smooth: the stem simple, round, upright, a foot high: the leaves opposite, embracing, oblong-ovate, acute, entire, an inch or a little more in length: the flowers aggregate, about three, sessile: the calyx is ten-angled: the petals are gashed, cre-



Drawn by Syd Edwards

London Published July 1st 1865. by G. Kearley Fleet Street

Engraved by F. Sargent

Lychnis chalcedonica
 1 Scarlet Lychnis

Leucojum vernum
 2 Spring snowflake

Lysimachia Nummularia
 3 Creeping Moneywort

nate-multifid: the filaments the length of the tube of the corolla, filiform: the germ superior: styles five, much shorter than the tube of the corolla. It is a native of China and Japan, flowering in June and July.

The fourth species has long, narrow, grass-like leaves, which come out from the root without order, sitting close to the ground; between these come up straight single stalks, which in good ground rise a foot and half high; at each joint of the stalk come out two leaves opposite, of the same form as the lower, but decreasing in their size upwards; under each pair of leaves, for an inch in length, there sweats out of the stalk a glutinous liquor, which is almost as clammy as birdlime, so that ants and other insects which happen to light upon these places, or attempt to creep up to the flowers, are fastened to the stalk; whence the title of Catchfly: the root is perennial, yellowish on the outside, white within: the stem round, not grooved, smooth, being terminated by a cluster of purple flowers, and from the two upper joints come out on each side of the stalk a cluster of the same flowers, so that the whole forms a sort of loose spike: these appear in the beginning of May, and the single flowers are succeeded by roundish seed-vessels, which are full of small angular seeds, ripening in July. It is a native of most parts of Europe.

The fifth has likewise a perennial root, the thickness of the little finger, white, of a slightly acrid and bitter taste, furnished with numerous fibres: the stalks are several, upright, from one to three feet high, round, hirsute, jointed, purple, the joints swelled: the uppermost branches forked: the leaves opposite, connate, ovate-acuminate, hirsute, slightly nerved: the calyx is hairy, striated, purple, five-toothed; in the female more turgid: the petals purple, obcordate: at the bottom of the lamina or broad spreading part are two or four small upright white blunt appendices: the germ is ovate, surrounded by a nectary at the base: the capsule one-celled, with ten teeth at the mouth: seeds gray, somewhat rugged. It is a native of many parts of Europe.

There is a variety with double flowers, cultivated in gardens by the name of Red Bachelor's Buttons, which is an ornamental plant, and continues long in flower.

The sixth species has the stalks branched out much more than in the fifth sort, being weaker and more flaccid: the leaves are longer and more veined: the flowers stand singly upon pretty long peduncles, and are not produced in clusters as in that; it is very hairy, the calyx is more swollen, and it flowers a month after it.

And Dr. Withering remarks, that the petals on the male plant have the laminae divided down to the claws, but in the female they are only cloven half way down. Dr. John Sibthorp also states that the capsules in the fifth are roundish, and that its scentless flowers stand open through the day; while this has conical capsules, and its odoriferous flowers open only towards evening. This also prefers a dry soil, while that spreads in a moist one. It is common in Siberia.

• There are varieties with purple or blush-coloured flowers; with quadrid petals; with hermaphrodite flowers; with double flowers, cultivated in gardens by the name of Double White Bachelor's Buttons.

Culture.—They may be increased with facility in the single sorts by seed, and parting the roots; and in the doubles by dividing or slipping the roots, and sometimes by cuttings of their stalks.

The seed should be sown in the early spring, as in March, in a bed or border of light earth, in an eastern aspect, each sort separate, raking them in lightly, or they may be sown in small drills. The plants come up in two or three weeks, when they should have occasional waterings and hand weedings: and when the plants are two or three inches high, be planted out in beds or borders, in rows six inches asunder, watering them till fresh rooted, letting them remain till the autumn or following spring, when they should be transplanted where they are to remain.

Both the single and double may be increased by slipping the roots; but it is more particularly applicable to the double sort, as they cannot with certainty be obtained from seed: the season for performing this work is the autumn, after the stalks decay, when the whole root may either be taken up, and divided into as many slips as are furnished with proper root-fibres, or the main root stand, and as many of the outer offsets as seem convenient be slipped off: these slips, when strong, should be planted at once where they are to remain; but when rather small and weak, it is better to plant them in nursery-rows, half a foot asunder, to remain a year, and then transplant them for good where they are to stand.

The planting of cuttings of the stalks is mostly practised for the double scarlet sort, when it increases but sparingly by offsets of the root. It is performed in summer, when the stalks are well advanced in growth, but before they flower, or have become hard and woody. Some of them should be cut off close to the bottom, and divided into lengths of from three to five joints, planting them in an easterly border of rich moist loamy earth, two-thirds of

their length into the ground, leaving only one joint or eye out, watering them directly, and repeating it occasionally with necessary shade in hot weather. They will be well rooted, and form proper plants for transplanting in the autumn. If the cuttings, as soon as planted, are covered down close with hand-glasses, it will greatly promote their rooting, so as to form stronger plants before the winter season comes on.

The only culture they require afterwards is clearing them from weeds in summer, and supporting with stakes them which need it, cutting down and clearing away the decayed stalks in the autumn.

Of the third sort, as being rather more tender, some plants should be planted in pots, for moving under the protection of a frame or greenhouse in the winter season.

They are all very ornamental for the pleasure-ground, particularly the doubles, and prosper in any common soil, remaining in all weathers unhurt, being of many years' duration in root; and, when of some standing, send up many stalks every spring, terminated by numerous flowers, making a fine appearance in summer. The Scarlet Double *Lychnis* claims the preference, though the single scarlet sort is also very showy. And all the other species in their respective double-flowered states are ornamental. They are all kept in the nurseries for sale. In planting out, the tallest growers should be placed the most backward, and the others more towards the front.

LYCIUM, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Lauridæ*.

The characters are: that the calyx is a sub-quinquefid perianthium, obtuse, erect, very small, permanent: the corolla monopetalous, funnel-form: tube cylindric, spreading, incurved: border five-parted, obtuse, spreading, small: the stamina have five awl-shaped filaments, from the middle of the tube, shorter than the corolla, closing the tube with a beard: anthers erect: the pistillum is a roundish germ: style simple, longer than the stamens: stigma bifid, thickish: the pericarpium is a roundish berry, two-celled: the seeds several and kidney-form: the receptacles convex, affixed to the partition.

The species are: 1. *L. Afrum*, African Box-thorn; 2. *L. barbarum*, Willow-leaved Box-thorn; 3. *L. Europæum*, European Box-thorn; 4. *L. Tartaricum*, Tartarian Box-thorn.

The first rises with irregular shrubby stalks ten or twelve feet high, sending out several

crooked knotty branches, covered with a whitish bark, and armed with long sharp spines, upon which grow many clusters of narrow leaves; these thorns often put out one or two smaller on their sides, which have some clusters of smaller leaves upon them: the branches are garnished with very narrow leaves an inch and a half long, and at the base of these come out clusters of shorter and narrower leaves: the flowers come out from the sides of the branches, standing upon short foot-stalks, and are of a dull purple colour: the berry is of a yellowish colour when ripe, very dark red, inclosing several hard seeds. It usually flowers in June and July, and the seeds ripen in the autumn; but frequently a few flowers come out in all the summer months. It is a native of the Cape.

The second species is a weak shrub, nodding and decumbent unless supported: the bark of the branches whitish: the flowers from each bud from two to five, each on its proper peduncle. It differs from all the other sorts in having the mouth of the calyx two-lobed, or sometimes three-lobed: the border of the corolla spreading, with the throat pale streaked with black, and purple or pale red within. It is a native of Europe, Asia, and the Cape, flowering from May to October.

There are several varieties. The first has a shrubby stalk seven or eight feet high, sending out several irregular branches, armed with strong spines, and furnished with short thick leaves: the flowers, which come out from the side of the branches are small and white. They appear in July and August, but do not produce seeds in this climate.

The second has the stalk four or five feet high, sending out many irregular branches, covered with a very white bark, and armed with a few short spines: the leaves are about three inches long, and one inch broad in the middle, alternate, pale green. The flowers appear in June and July, and are succeeded by small round berries that ripen in the autumn, when they become as red as coral.

The third rises with weak irregular diffused branches to a great height, requiring support: some of these branches have in one year been upwards of twelve feet long: the lower leaves are more than four inches long, and three broad in the middle; they are of a light green and a thin consistence, placed without order on every side the branches. As the shoots advance in length, the leaves diminish in size, and towards the upper part are not more than an inch long and a quarter of an inch broad; sitting close to the stalks on every side. The flowers come out singly at every joint towards the upper part of

the branches, on short slender peduncles, and are of a pale colour with short tubes; the brims are spread open, broader than either of the former sorts, and the style is considerably longer than the tube of the corolla. It flowers in August, September, and October, retaining its leaves till November, and is a native of China.

The third is able to stand upright without support; differing from the above in having the leaves, though lanceolate, not flat but oblique or flexuose: the branchlets flexuose, not rendered angular by a line running down from the petiole; the surface not smooth, but subtomentose; and finally, spines from every bud. It differs from the first in having lanceolate leaves, and round flexuose branchlets. It is a native of the South of Europe.

The fourth species is an elegant shrub, on account of the whiteness of the branches, rods, or twigs, which are many, a foot or eighteen inches long or more, branched, ascending: the spines alternate, awl-shaped, rigid, spreading, white or yellowish, surrounded with leaves and flowers at the base: the leaves are sessile, fleshy, blunt: flowers from the upper part of the twigs among the leaves, two or three to each spine, on short peduncles: the berries the size of a currant, black and succulent. It is a native of Tartary. It differs from the third sort in size, and the colour and form of the flower.

Culture.—These plants may all be increased by seeds, cuttings, or layers.

The seeds should be sown in the autumn soon after they are ripe, in pots, being plunged into an old tan-bed in winter, and covered with the glasses in frosty weather; but in mild weather be open to receive moisture; in the following spring the pots should be plunged into a moderate hot-bed, to bring up the plants, which must be inured to bear the open air as soon as the danger of frost is over, and when they are three inches high, be shaken out of the pots, and each planted in a small separate pot filled with loamy earth, being placed in the shade till they have taken new root, when they may be removed to a sheltered situation, to remain till the autumn, when they should be either removed into the greenhouse, or placed under a hot-bed frame, to shelter them from hard frost. They must at first be kept in pots, and treated in the same way as myrtles, and other hardy green-house plants; but when they are grown strong, a few of them may be planted out in the open ground in warm situations, where they stand moderate winters, but are commonly destroyed by hard frosts.

The cuttings should be made from the young shoots, and be planted in a shady border in July,
VOL. II.

being duly watered; and when they have taken root, be treated in the same way as the seedling plants. This is the usual mode of increasing them, as some sorts never produce seeds in this climate.

In the third sort the cuttings should be planted in the spring, in an eastern border; and the plants should not be removed till the autumn, when they may be planted to cover walls, as the branches are too weak to support themselves.

The third variety may also be increased by dividing and planting its creeping roots.

The layers must be made from the young branches, and be laid down in the spring; and when rooted in the autumn, taken off, and managed as in the other methods.

The hardy sorts afford variety in warm situations in the open ground, and the other sorts among green-house collections.

LYSIMACHIA, a genus containing plants of the hardy herbaceous biennial and perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rotaceae*.

The characters are: that the calyx is a five-parted perianthium, acute, erect, permanent: the corolla one-petalled, wheel-shaped: tube none: border five-parted, flat: divisions ovate-oblong: the stamens have five awl-shaped filaments, opposite to the divisions of the corolla: anthers acuminate: the pistillum is a roundish germ: style filiform, the length of the stamens: stigma obtuse: the pericarpium is a globular capsule, mucronate, one-celled, ten-valved (five-valved): the seeds very many, and angular: the receptacle globular, very large, dotted. (free.)

The species cultivated are: 1. *L. Ephemerum*, Willow-leaved Loose-strife; 2. *L. dubia*, Purple-flowered Loose-strife; 3. *L. stricta*, Upright Loose-strife.

The first has a perennial root: the stems several, upright, more than three feet high: the leaves narrow, smooth, and at the base of these come out short side branches, with smaller leaves of the same shape: the flowers are produced in a long close upright spike, at the top of the stalk: the corolla is white: the stamens longer than the corolla. It is very distinct from the second sort by its size, five-valved capsules, white flowers, and leaves without dots. It is a native of Spain, flowering from July to September.

The second species is an annual (biennial) plant, too tender for the open air of this climate: it agrees with the first sort in habit, structure, and glaucous colour: it has no dots

under the leaves: the petals are acuminate, a little longer than the calyx, converging, and deep red: the stamens are longer than the corolla, with brown anthers: and the flowers sessile in a spike. It is nearly allied to the first sort, and is a native of the Levant, flowering in July and August.

The third has the stem erect, four-cornered, smooth: the leaves quite entire, acute, smooth, dotted: the racemes simple: the pedicels in a sort of whorl, filiform, an inch long: the bractes lanceolate, very short: the divisions of the calyx lanceolate, smooth, dotted with red: the petals three times as long as the calyx, yellow, with red stripes and dots, and two dark-red spots: the stamens shorter than the corolla. It is a native of North America, flowering in July and August.

Culture.—These may all be readily increased either by sowing the seeds in the autumn, as soon as they are fully ripened, on a moist border, with an eastern aspect; or by parting the roots, and planting them out at the same season, in the same situations.

The plants should afterwards be kept clean, and in the first method removed into the situations where they are to remain in the autumn.

In the second sort the seeds should be sown on a hot-bed.

The third sort is increased by planting the bulbs thrown out from the axils of the leaves.

They all afford ornament and variety in the borders and other parts of pleasure-grounds.

LYTHRUM, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leaved perianthium, cylindric, striated, with twelve teeth, alternately smaller: the corolla has six oblong petals, bluntish, spreading, with the claws inserted into the teeth of the calyx: the stamina have twelve filiform filaments, the length of the calyx; the upper ones shorter than the lower: anthers simple, rising: the pistillum is an oblong germ: style awl-shaped, the length of the stamens, declined: stigma orbiculate, rising: the pericarpium is an oblong acuminate capsule, straight, two-celled or one-celled: the seeds numerous and small.

The species cultivated is *L. Salicaria*, Common or Purple Willow-herb.

Other species may be introduced into cultivation.

It has a perennial root, thick branched, somewhat woody, widely extended: the stem from two or three to four or six feet high, up-

right, tinged with red, below smooth and four-cornered, above pubescent and five-cornered; corners sharp, membranaceous, rugged: the upper branches scattered, lower opposite, four-cornered, rugged, and slightly downy, upright, shortish, numerous: the leaves sessile, embracing, about three inches long, smooth above, underneath slightly downy, somewhat rugged, veined, spreading, all opposite, or all alternate, or the lower opposite, and the upper alternate: the flowers in clusters, placed at a little distance from each other, in the axils of the leaves, each consisting of about eight flowers (six or twelve), together forming a long leafy spike. It is a native of most parts of Europe, flowering late in the summer.

There are several varieties; in the first of which the stalks are upright and branching, three feet high: the leaves cordate ovate, an inch long, and three quarters of an inch broad, downy, and placed by threes: the flowers in long spikes, disposed in thick whorls, with spaces between each; they are of a fine purple colour. It is smaller than the common sort, much more downy, and the leaves broader. It often varies with three leaves to a joint; in which case the stem is six-cornered; and sometimes even with four leaves at a joint. And Linnæus mentions a variety, in which the stem is a foot high and simple: the leaves alternate, cordate-lanceolate, sessile: the flowers from each upper axil, solitary, and sessile.

There is also a variety which does not grow more than a foot high: the leaves smooth, growing by threes, narrower and shorter than the common sort: the flowers in terminating spikes, of a light purple colour, appearing in July. Likewise, in which the stalks are slender, not more than nine or ten inches long, spreading out on every side: the lower part has oblong-ovate leaves, placed opposite: on the upper part the leaves are narrower and alternate: the flowers come out singly from the side of the stalks at each joint; they are larger than those of the common sort, and of a deeper purple colour; making a fine appearance in July, when they are in full beauty and perfection.

Culture.—This sort and varieties may be readily increased by parting the roots in autumn, and planting them out in the situations where they are to remain. They may likewise be raised from seed sown at the same time; but the first is the readiest method.

They delight in a rather moist soil.

All of them are highly ornamental in the larger borders, clumps, and other parts of pleasure-grounds, being placed towards the back parts.

MACAW-TREE. See COCOS.
MACEDONIAN PARSLEY. See
 BUBON.

MAD APPLE. See SOLANUM.

MADDER. See RUBIA.

MADWORT. See ALYSSUM.

MAGNOLIA, a genus containing plants of the evergreen and deciduous tree kinds.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Coadunatæ*.

The characters are: that the calyx is a three-leaved perianthium: leaflets ovate, concave, petal-shaped, deciduous: the corolla has nine oblong petals, concave, blunt, narrower at the base: the stamina have numerous filaments, short, acuminate, compressed, inserted into the common receptacle of the pistils below the germs: anthers linear, fastened on each side to the margin of the filaments: the pistillum has numerous germs, ovate-oblong, two-celled, covering a club-shaped receptacle: styles recurved, contorted, very short: stigmas longitudinal of the style, villose: the pericarpium is an ovate strobile, covered with capsules, which are compressed, roundish, scarcely imbricate, clustered, acute, one-celled, two-valved, sessile, opening outwards, permanent: the seeds two or one, roundish, berried, hanging by a thread from the sinus of each scale of the strobile.

The species cultivated are: 1. *M. grandiflora*, Laurel-leaved Magnolia; 2. *M. glauca*, Swamp Deciduous Magnolia; 3. *M. acuminata*, Blue Magnolia; 4. *M. tripetala*, Umbrella Magnolia, or Umbrella Tree.

The first rises with a straight trunk of two feet or more in diameter to the height of seventy or eighty feet, or more, dividing into many spreading branches, that form a large regular head: the leaves are nine or ten inches long, and three inches broad in the middle, of a thick consistence, resembling those of the common laurel, but much larger, entire, but a little waved on their edges, of a lucid green on the upper surface, and sometimes russet-coloured underneath; they are sessile, placed without order on every side the branches, and continue green throughout the year, falling off only as the branches extend, and new leaves are produced: the flowers are produced at the ends of the branches; are very large, and are composed of eight or ten petals, narrow at their base, but broad, rounded, and a little waved at their extremities; they spread open very wide, are of a pure white colour, having an agreeable

scent. In its native country it begins to produce flowers in May, and continues a long time in flower, so that the woods are perfumed with their odour the greatest part of the summer: but in this climate it seldom begins to flower till the middle or end of June, and does not continue long in beauty. It is a native of Florida and Carolina.

It varies with broad leaves, and with narrow leaves.

The second species grows about fifteen or sixteen feet high, with a slender stem, covered with a smooth whitish bark: the wood is white and spongy: the leaves thick and smooth, resembling those of the bay, entire, dark green on their upper surface, but whitish or glaucous and a little hairy underneath: the flowers are produced in May and June at the extremity of the branches; are white, and have an agreeable sweet scent, with only six concave petals: after these are past the fruit increases to the size of a walnut, with its cover an inch or more in length, and three-fourths of an inch in diameter, of a conical shape: the seed is about the size of a kidney-bean: this fruit is at first green, afterwards red, and when ripe of a brown colour. Where it grows naturally, there is a succession of flowers on the trees for two months or more: but in this climate there are seldom more than twelve or fourteen flowers on a tree, and those of short duration. It is a native of North America.

The young plants often retain their leaves through the greatest part of winter; but, when three or four years old, constantly cast their leaves by the beginning of November.

There is a variety with long leaves, which is evergreen.

The third grows sometimes to the height of thirty or forty feet, in its native state, and the trunk is eighteen inches or more in diameter: the leaves near eight inches long, and five broad: the flowers come out early in the spring, are composed of twelve large blueish-coloured petals: the fruit is about three inches long, somewhat resembling a small cucumber; whence the inhabitants of North America call it Cucumber Tree: the wood is of a fine grain, and an orange colour. It is a native of North America.

The fourth species grows from sixteen to twenty feet high, with a slender trunk, covered with a smooth bark, and dividing into several branches: the leaves are remarkably large, often from twelve to fifteen inches or more in

length, and five or six in width, narrowing to a point at each extremity, placed at the ends of the branches in a circular manner, somewhat like an umbrella, whence its name: the flowers are composed of ten, eleven, or twelve large, oblong, white petals; the outer ones hanging down: the seed-vessels are oblong, conical, between three and four inches in length, and about an inch and half in diameter. The wood is soft and spongy; and the leaves drop off at the beginning of winter. It is a native of Carolina, Virginia, &c.

Culture.—These plants may all be increased by seed, layers, and cuttings.

In the first mode, the seed, which is received annually from America, preserved in sand, early in the spring, should be sown as soon after as possible in pots of light rich earth, half an inch deep, plunging them in a moderate hot-bed, to bring up the plants an inch or two in height, or in the common earth under a warm wall or hedge, or in a frame, in the full sun, till the middle or latter end of April, then replunging them in an easterly border open to the morning sun; giving moderate sprinklings of water in dry weather. The plants will rise the same year; those in the hot-bed, probably in April, and the others in May, inuring those in the first situation timely to the full air. The plants should all summer be regularly supplied with water, and at the approach of winter be removed into a green-house, or rather under a garden-frame, to be sheltered from frost all winter, indulging them with the open air in mild weather. If the pots be plunged in a bark hot-bed, &c. about March, under a frame, two or three months, it will forward the plants greatly; being careful to give water, and harden them to the open air gradually, so as to be removed into it in their pots fully in June, to remain till the autumn, when they should be allowed shelter in winter, as before. The spring following, they should be planted into separate pots, and plunged into a hot-bed as before to set them forward, giving water, occasional shade, and the benefit of free air; and in June removing the pots to a shady border for the remainder of the summer. In winter they should have shelter as before, from severe frost, but have the full air in all open weather. They require the same care for two or three winters, when some of them may be turned out of the pots with balls of earth about their roots, into the full ground, in a warm sheltered situation, particularly the deciduous kinds; but the first or evergreen sort should not be too soon exposed to the winter's cold, but be continued in occasional shelter in the above manner four or five years, till two, three, or more feet high;

and when turned out, matted occasionally in severe winters, retaining some in pots to be managed as green-house plants of the more hardy kind.

The layers should be laid down in autumn or spring, choosing the young pliable shoots for the purpose, giving them a gentle twist, or a slit in the part laid into the earth. Some will be well rooted in one year, others probably not in less than two; then take them off, and plant each in a pot in the early spring, plunging them in a moderate hot-bed for a month or two, to promote their growing freely at first, and they will form good strong plants by the following autumn, allowing them shelter in winter for a year or two, when they may be planted out.

The cuttings should be made from the short young shoots of the preceding year, and be planted in pots of good earth, plunging them to the rims in the common or stove hot-bed, giving water and occasional shade; some of them will be rooted the same year, when they must be inured by degrees to the open air, after which they may be managed as the layers.

The first or evergreen sort is one of the most beautiful trees in nature, both in its growth, and in the luxuriance of its noble leaves, which render it singularly conspicuous at all seasons.

The deciduous sorts are also highly ornamental trees, and may be introduced into clumps and shrubberies, where by their fine foliage they exhibit an elegant variety.

All the different species are cultivated in the nurseries, for sale, from which they may be taken up and planted out in the early spring or autumn months; but the former is the better.

In their disposition in the shrubbery, as they are rather tender in their early growth, they should have a sheltered sunny situation, in a rather dry soil, being planted in the most conspicuous places, and not too closely crowded with other shrubs.

They have also a good effect when disposed singly in different parts, in open spaces of short grass-ground, in sheltered situations; especially the first sort.

MAHERNIA, a genus containing plants of the shrubby exotic kind, for the green-house.

It belongs to the class and order *Pentandria Pentagynia*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved perianthium, five-cleft, bell-shaped; with awl-shaped longer teeth; permanent: the corolla has five heart-shaped petals, oblong, spreading, twice as long as the calyx: nectaries five,

obcordate, pedicelled, surrounding the germ, shorter than the calyx: the stamina have five filaments, capillary, placed on the nectary, united at the base, shorter than the calyx: anthers oblong, acuminate, erect: the pistillum is a sub-pedicelled germ, obovate, five-angled: styles five, bristle-shaped, erect, the length of the petals: stigmas simple: the pericarpium is an ovate capsule, five-celled, five-valved: the seeds few, and kidney-form.

The species cultivated are: 1. *M. pinnata*, Wing-leaved Mahernia; 2. *M. incisa*, Cut-leaved Mahernia.

The first rises with a shrubby stem near three feet high, sending out many slender delicate branches, covered with a reddish bark: the flowers come out from the side of the branches in small clusters, are of a lively red when they first open, and hang down like little bells, commonly two together; appearing from June to August and September. It is a native of the Cape.

In the second species, the stalks to the naked eye discover a manifest roughness; with a magnifying glass, it appears that they are beset on every side with little protuberances, whence issue tufts of pellucid hairs, and here and there a single hair is discoverable with a small red viscid globule at its extremity: a portion of the stalk, when highly magnified, somewhat resembles that of the creeping *Cereus*: the leaves, which are not so manifestly hairy as the stalk and calyxes, are deeply jagged on the edges, and somewhat resemble those of *Pelargonium Tricolor*: the flowers when in bud are of the richest crimson: as they open they incline to a deep orange, and finally become yellowish. It is a native of the Cape.

Culture.—These plants may be increased by planting cuttings of the young branches in the summer season singly, in pots of light mould, watering them, and plunging them in a hot-bed till they have stricken root. When they have become well rooted, they may be removed into the green-house for protection during the winter season; being managed as the less tender plants of this sort.

They afford variety among other potted plants of a similar kind.

MAHOGANY TREE. See SWIETENIA.

MAIDENHAIR TREE. See SALISBURIA.

MALABAR NUT. See JUSTICIA.

MALE BALSAM APPLE. See MOMORDICA.

MALLOW. See MALVA.

MALLOW, INDIAN. See SIDA.

MALLOW TREE. See LAVATERA.

MALLOW, VENICE. See HIBISCUS.

MALOPE, a genus containing a plant of the herbaceous kind.

It belongs to the class and order *Monadelphiu Polyanthia*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a double perianthium: outer three-leaved, broader: leaflets cordate, acute, permanent: inner one-leaved, half-five-cleft, more erect, permanent: the corolla has five obcordate petals, præmorse, spreading, fastened to the tube of the stamina at the base: the stamina have numerous filaments, at bottom united into a tube, above, at, and below the apex of the tube, separate and loose: anthers almost kidney-form: the pistillum has roundish germs: style simple, the length of the stamina: stigmas many, simple, bristle-shaped: the pericarpium is a roundish capsule, many-celled: cells as many as there are stigmas, conglomerated into a head: the seeds solitary and kidney-form.

The species cultivated is *M. Malacoides*, Betony-leaved Malope.

In the whole plant it has greatly the appearance of the mallow, but differs from it in having the cells collected into a button, somewhat like a blackberry: the branches spread, and lie almost flat upon the ground, extending a foot or more each way: the flowers are produced singly upon long axillary peduncles, and are in shape and colour like those of the mallow. It is a native of Tuscany, &c.

Culture.—This may be increased by sowing the seeds, in the places where the plants are designed to remain, as it does not bear transplanting well: when they are sown upon a warm border in August, the plants also frequently stand through the winter, and flower early the following season, so as to produce good seeds: but when sown in the spring, this is rarely the case.

The plants sown in the spring in pots should be protected in winter under a frame. They seldom continue longer than two or three years.

They afford variety among other plants in the borders, &c.

MALPIGHIA, a genus containing plants of the exotic evergreen shrubby kind, for the stove.

It belongs to the class and order *Decandria Trigynia*, and ranks in the natural order of *Trifoliatae*.

The characters are: that the calyx is a five-leaved erect perianthium, very small, permanent, converging: there are two melliferous glands, oval and gibbous, fastened to the calyxine leaflets on the outside and at bottom: the corolla has five petals, kidney-form, large,

plaited, ciliate, spreading, concave; with long linear claws: the stamina have ten broadish filaments, awl-shaped, erect, placed in a cylinder, united below, small: anthers cordate: the pistillum is a roundish germ, very small: styles three, filiform: stigmas blunt: the pericarpium is a globular berry, torulose, large, one-celled: the seeds three, bony, oblong, blunt, angular; with an oblong blunt kernel.

The species cultivated are: 1. *M. glabra*, Smooth-leaved Barbadoes Cherry; 2. *M. punicifolia*, Pomegranate-leaved Barbadoes Cherry; 3. *M. urens*, Stinging Barbadoes Cherry; 4. *M. nitida*, Shining-leaved Barbadoes Cherry; 5. *M. angustifolia*, Narrow-leaved Barbadoes Cherry; 6. *M. crassifolia*, Thick-leaved Barbadoes Cherry; 7. *M. verbascifolia*, Mullein-leaved Barbadoes Cherry; 8. *M. coccigera*, Scarlet Grain-bearing Barbadoes Cherry.

The first grows to the height of fifteen, sixteen, or eighteen feet, with several trunks, covered with a clay-coloured smooth bark, and dividing into many spreading branches, making a pleasant round head: the leaves are opposite, subsessile, acute, continuing all the year: the flowers are in axillary and terminating bunches, or umbels, on peduncles half an inch long, and about four flowers on each, of a bright purple: the pedicels have a single joint: the fruit red, round, the size of a cherry, smooth-skinned, having one or more furrows on the outside, and containing within a reddish, sweetish, not unpleasant, copious, juicy pulp.

It is found in the West-Indies, flowering from December to March.

The second species rises with a shrubby stalk from seven to ten or twelve feet high, dividing into several slender spreading branches, covered with a light brown bark: the flowers are produced in small umbels at the end of the branches, upon short peduncles: the corolla is pale rose-colour: the berry roundish, pulpy, with several furrows, red when ripe, inclosing three or four hard angular seeds. It is of the same size and make with our common cherries, very succulent, and of a pleasant subacid taste; having much the appearance of the pomegranate. It is a native of the West-Indies.

The third is a shrub, which rises with a strong upright stem about three feet high, covered with a brown bark, sending out several side branches which grow erect: the leaves ending in acute points, sessile, covered with fine bristles, which do not appear unless closely viewed: these bristles are double-pointed, and sustained by pedicels of the same fragile transparent substance with themselves, descending from the

middle of them: these are easily broken, but the bristles enter pretty deep in, and stick close to whatever has forced them off. The flowers come out upon long slender peduncles from the axils at each joint, four, five, or six together, in a sort of whorl. It flowers in July and August, (to October), and is found in the West-Indies.

The fourth species is a shrub, a fathom in height: the stem upright, round, even: the branches decussated, upright, round, covered with a shining bark: the leaves decussated opposite, oblong, blunt, with a convex margin, nerved, veined, firm, pale-green, shining, on short petioles: the racemes axillary, shorter than the leaves, many-flowered: the flowers peduncled, the same size as in the first sort, yellow: the berry three-lobed, three-seeded, and blood-red. It is a native of the West-Indies.

The fifth rises with a shrubby stalk seven or eight feet high, covered with a bright purplish bark, which is spotted and furrowed, dividing towards the top into several smaller branches: the leaves are numerous, about two inches long, and a quarter of an inch broad, acuminate, of a lucid green on their upper side, but of a russet brown on their under, where they are closely armed with stinging bristles: the flowers are from the side and at the end of the branches in small umbels, small, and of a pale-purple colour: the fruit small, oval, furrowed, and dark purple when ripe. It is a native of the West-Indies, flowering in June.

The sixth species is a tree, with the leaves a hand in length, thick, subpetioled, quite entire, pubescent above, tomentose underneath, commonly alternate: the racemes long, tomentose; and according to Brown, the upper branches terminate in loose bunches of flowers, each of the divisions being simple, as well as the top of the main supporter, which terminates also in a single spike. It is a native of the West-India islands.

The seventh has the leaves ending in the petioles, a foot long, villous, clothed underneath with a very close nap: the racemes long and villous. It is a native of South America.

The eighth species is a very low shrub, seldom rising more than two or three feet high: the stalk thick and woody, as are also the branches, which come out on every side from the root upwards, and are covered with a rough gray bark: the leaves lucid, half an inch long, and almost as much broad, appearing as if cut at their ends, where they

are hollowed in, and the two corners rise like horns, ending in a sharp thorn, as do also the indentures on the sides: the flowers come out from the side of the branches, upon peduncles an inch long, each sustaining one small pale bluish flower: the fruit is small, conical, furrowed, changing to a purple red colour when ripe. It is found in the West-Indies.

Culture.—These plants may be increased by sowing the seeds in the spring, in pots of light rich earth, and plunging them in a hot-bed. When the plants have attained a few inches in growth they should be planted out into separate small pots, re-plunging them in a bark hot-bed in the stove, where they should remain, the two first winters, being afterwards placed in a dry stove, and kept in a moderate warmth, water being occasionally given in small quantities.

They afford ornament among collections of plants of similar kinds.

MALVA, a genus containing plants of the herbaceous, annual, biennial, perennial, and shrubby kinds.

It belongs to the class and order *Monadelphia Poljandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a double perianthium: outer three-leaved, narrower: leaflets cordate, acute, permanent: inner one-leaved, half-five-cleft, larger, broader, permanent: the corolla has five obcordate petals, præmorse, flat, fixed to the tube of the stamens at the base: the stamina have numerous filaments, united below into a tube, seceding and loose at the top and surface of it: anthers kidney-form: the pistillum is an orbicular germ: style cylindric, short: stigmas very many, bristly, the length of the style: the pericarpium is a roundish capsule, composed of very many cells, (as many as there are stigmas,) two-valved, placed in a whorl about a columnar receptacle, finally falling: the seeds are solitary, very seldom two or three, kidney-form.

The species cultivated are: 1. *M. spicata*, Spiked Mallow; 2. *M. Americana*, American Mallow; 3. *M. Peruviana*, Peruvian Mallow; 4. *M. Caroliniana*, Creeping Mallow; 5. *M. Orientalis*, Oriental Mallow; 6. *M. verticillata*, Whorl-flowered Mallow; 7. *M. crispa*, Curled Mallow; 8. *M. Ægyptia*, Palmated Mallow; 9. *M. Alcea*, Vervain Mallow; 10. *M. moschata*, Musk Mallow; 11. *M. Capensis*, Gooseberry-leaved or Cape Mallow.

The first has the stem pale-green, two or three feet high, and branched: the leaves are almost round, an inch and quarter long, and three

quarters of an inch broad at the base, pale-green, smooth, on petioles three quarters of an inch in length: the tops of the twigs and branches, for the length of an inch, are thick set, in a spike with orange-coloured flowers, in very hirsute calyxes. It is a native of Jamaica, flowering in September and October.

The second has an annual root: the stem is a foot high, stiff, round, somewhat hairy: branches few, short, upright, from the lower axils: the leaves scarcely tomentose: peduncles axillary, upright, solitary, one-flowered: the spike terminating, with many sessile flowers, expanding after noon: the corolla yellow. It is a native of North America, flowering in June and July.

The third is also an annual plant: the stem from two to three feet high, with hairs thinly scattered over it, usually in pairs: the leaves seven-lobed, (five or three) plaited, smooth, veined, sharply serrate, on petioles the length of the leaf: the stipules ovate-lanceolate: the peduncles long, naked: the spike directed to one side, turned upwards, recurved before the flowers open: the corollas small, purple. According to Jacquin, the flowers are red: but others say, pale blue, and set very closely on the spikes, appearing in June. It grows naturally in Peru.

The fourth has an annual root: the stems creeping, eighteen inches and longer, round, putting out roots at the lower joints, hairy: the leaves villose, soft; those next the root large, roundish, gash-serrate, smaller and more deeply divided as they ascend, five-lobed and seven-lobed, all on long hairy petioles, gashed and serrate on the edge: the flowers are axillary and terminating, on almost upright peduncles, from an inch to an inch and half in length, small, the colour of Burgundy wine: the claws of a darker red. It is a native of Carolina.

The fifth species is an annual plant, with an upright stalk: the flowers are large, and of a soft red-colour. According to Martyn, the stalk is six feet or more in height, and the flowers not purple, but dark red, with the veins so dark as to be almost black. It was found in the Levant.

The sixth has the root annual, three feet high: the leaves cordate, five- or seven-angled, subcrenate, smooth, on long alternate petioles: the flowers are whitish red, small, on one-flowered peduncles. It is a native of China, and Cochinchina, flowering in June and July.

The seventh species is also annual: the stem upright, four or five feet high: the leaves curled on their edges: the stem thick, round, green, hirsute below, branched, from three to four

feet high: the lower leaves a hand wide, on long petioles; the upper ones smaller, on shorter petioles; the uppermost very small, almost sessile: all obscurely angular, sinuate, bright green, pubescent: the flowers sessile in the axils, over the whole stem and branches, small in proportion to so large a plant. It is a native of Syria, flowering from June to August.

The eighth is likewise an annual plant, with stalks about a foot long, smooth, and declining: the leaves on pretty long footstalks: the flowers single from the axils, and at the top in clusters: the calyxes large, acute: the corollas small, pale blue. It is a native of Egypt, flowering in June and July.

The ninth has the root long, branched, and perennial: the stem from two to three feet high, round, rugged, hairy: hairs in bundles, spreading: branches alternate: the leaves alternate, semiorbicular, five-parted to the base, with the lobes oblong, three- or five-parted, bright green, whitish underneath, pubescent, somewhat rugged: the petioles round, with very small awl-shaped stipules at the base: the flowers terminating in panicles or bundles: the calyx small in proportion to the size of the corolla, pubescent; outer small, inner much larger: the corolla an inch and half or two inches long, five-parted to the base, bright purple; with blunt two-lobed segments. It is a native of many parts of Europe.

The tenth species has root-leaves roundish, kidney shaped, entire, except being crenate on the margin: the first stem-leaves three-lobed, divided half way down: side-lobes divided again into two or three, but not so deeply: above these they are three-lobed to the footstalk: lobes again deeply divided; divisions deeply jagged: higher ones five-lobed, lobes pinnatifid, segments of the upper ones more divided, and narrower; uppermost linear: the stem round, much branched, slightly hairy: at the origin of each branch, two lanceolate hairy stipules: the flowers crowded on the top of the stem and branches on short peduncles, and single ones from the axils of the upper leaves: petals heart-shaped, divided nearly to the base, pale red or flesh-coloured, with deeper veins. It differs from the ninth sort, with which it has been confounded, in having the stem not so tall, with solitary upright hairs rising from a prominent little point: the arils rough with hairs: the flowers of an ambrosial or musky scent: the musky smell is not however always to be perceived. Mr. Curtis, on cultivating both species together, found the ninth grow nearly to twice the height of this,

and to be in every respect a stronger plant, and harsher to the touch. It is a native of many parts of Europe.

The eleventh rises with a woody stalk ten or twelve feet high, sending out branches from the side, the whole length: the stalks and branches are closely covered with hairs: the leaves are hairy, indented, on their sides, so as to have the appearance of a trilobate leaf: those on the young plants are three inches long and two broad at their base: but as the plants grow older, they are scarcely half that size: the flowers come out from the side of the branches, upon peduncles an inch long; they are of a deep red colour, shaped like those of the common mallow, but smaller. It flowers great part of the year, and is a native of the Cape.

There are varieties in which the stems are thicker and higher, of a brownish red colour: the leaves hirsute, broader, with wider segments, less deeply cut, but with the toothlets sharper and serrate: the whorls of fruit a little larger, and not mucicated; and in which the hairs of the leaves and stem are simple, not compound: the flowers almost upright, not drooping.

Culture.—The ten first sorts are all capable of being raised from seeds, which, in the hardy kinds, should be sown in the situations where the plants are to grow, in patches of four or five in each, in the spring or beginning of autumn, covering them to the depth of half an inch. They may likewise be sown upon a bed of fine earth, and be afterwards removed to the places where they are to flower. Those which are natives of hot climates, should be sown in pots and plunged in a hot bed.

When the plants in the two latter modes have attained some growth, they should be removed into their proper situations, or into other pots, to be afterwards managed according to the difference of the kinds.

The last sort and varieties may be raised also by seed, which should be sown upon a hot-bed, or in pots and plunged in it. When the plants have attained some growth, they should be removed into separate pots, replunging them in the hot-bed till fresh rooted, when they should be gradually inured to the full air, managing them afterwards in the same manner as other exotics of the green-house kind.

The hardy sorts afford a pleasing variety in the shrubbery and other parts, while those of the more tender and shrubby kind produce a good effect in the green-house, and among potted collections.

MANMEA, a genus containing plants of the evergreen exotic tree kind.

It ranks in the class and order *Polygamia*

Monoclin, or *Dioclin*, and ranks in the natural order of *Guttiferae*.

The characters are: that in the hermaphrodite, the calyx is a one-leafed perianthium, two-parted: divisions roundish, concave, coriaceous, coloured, spreading very much, deciduous: the corolla has four roundish petals, concave, spreading very much, subcoriaceous, longer than the calyx: the stamina have numerous bristle-shaped erect filaments, very short, inserted into the receptacle, ending in oblong, blunt, erect anthers: the pistillum is a roundish, depressed germ: style cylindric, erect, longer than the stamens, permanent: stigma capitate, convex: the pericarpium is a roundish fleshy berry, very large, acuminate with part of the style, with a coriaceous rind, one-celled: the seeds four, subovate, rugged, distinct from the flesh: male on the same or a different tree: the calyx, corolla, and stamina, as in the hermaphrodite.

The species is *M. Americana*, American Mammee.

It is a tall upright handsome tree, with a thick spreading elegant head, and a long down-right tap-root, which renders it very difficult to transplant: the younger branchlets are quadrangular: the leaves oval or obovate, quite entire, blunt, extremely shining, leathery, firm, with parallel transverse streaks, on short petioles, opposite, from five to eight inches in length: the peduncles one-flowered, short, scattered over the stouter branches: the flowers are sweet, white, an inch and half in diameter: the fruit roundish, or obsoletely three-cornered or four-cornered according to the number of seeds, one or two of which are frequently abortive, varying in size from three to seven inches in diameter, being covered with a double rind: the outer leathery, a line in thickness, tough, brownish yellow, divided by incisures longitudinally decussated; the inner thin, yellow, adhering strongly to the flesh; which is firm, bright yellow, has a pleasant singular taste, and a sweet aromatic smell; but the skin and seeds are very bitter and resinous. It is eaten raw alone, or cut in slices with wine and sugar, or preserved in sugar. It is a native of the Caribbee islands.

Culture.—These trees may be raised from seeds procured from America, which should be sown in the early spring, in pots filled with light fresh mould, plunging them in a bark hot-bed, keeping the mould moist by occasional watering, when they will soon come up. The young plants should be often watered in dry weather. When they have attained some growth, they should be removed with earth

VOL. II.

about them, into other pots a little larger, being replunged in the hot-bed till fresh rooted, filling up the pots with fresh mould; due shade, air, and water being given. In the autumn they should be removed into the stove, where they must be kept, being shifted into other pots in the following spring; having regard not to over-pot them.

They may also be raised by placing the stones of the fruit under the pots upon the tan, more expeditiously than when planted in the mould of the pots.

They afford a fine variety among other stove plants.

MANGA. See **MANGIFERA**.

MANGIFERA, a genus containing a plant of the tree exotic kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Terebinthaceae*.

The characters are: that the calyx is a five-parted perianthium: divisions lanceolate: the corolla has five lanceolate petals, longer than the calyx: the stamina have five awl-shaped filaments, spreading, the length of the corolla: anthers subcordate: the pistillum is a roundish germ: style filiform, the length of the calyx: stigma simple: the pericarpium is a kidney-form drupe, oblong, gibbous, compressed: the seed is a kernel, oblong, compressed, lanuginose.

The species cultivated is *M. Indica*, Mango-tree.

It is a large spreading tree in its native state: the wood is brittle, brown, and used only for indifferent works: the bark becomes rugged by age: the leaves are seven or eight inches long, and two or more broad, lanceolate, quite entire, smooth, of a fine shining green, and a sweet resinous smell, terminating in points, and having several transverse parallel opposite ribs; they are on short petioles, and grow in bunches at the extremity of the branches. The flowers are produced in loose bunches at the end of the branches. The fruit, when fully ripe, is yellow and reddish, replete with a fine agreeable juice, being sometimes as big as a large man's fist. It grows naturally in most parts of India, &c.

There are several uncultivated varieties.

Culture.—As the vegetative property of the seed or nuts of this species does not seem to be long preserved, the readiest method to obtain plants, is to have a quantity of the nuts set in tubs of earth in the country where they grow naturally, and when the plants are grown a foot high, to have them shipped, placing a covering over them to defend them from the water and spray of the sea, being careful not to give them too

N

much water in the passage. When they arrive in a cold climate, they should be screened from cold. The plants should afterwards be set in pots filled with light kitchen-garden earth, and be placed in a dry stove, where, in warm weather, they should have fresh air daily, and in winter the air be kept up to temperate, as marked on the botanical thermometer; as they do not succeed well in the tan-bed.

Where the nuts are made use of, they should be sent over in wax to preserve their vegetative property.

They may also be increased from cuttings, in the manner of *Gardenia*, in this climate.

MANGO-TREE. See *MANGIPERA*.

MANGROVE GRAPE-TREE. See *Coccoloba*.

MANNA ASH. See *FRAXINUS*.

MANURE, such substances or materials, whether of the dung, compost, or other kinds, as are useful in the improvement of land, so as to produce good vegetable crops.

Materials of this kind are necessary to all soils, to repair them when exhausted by the growth of vegetables, and cure their defects; being thus beneficial in enriching and fertilizing such as are poor, and in rendering such as are strong or stubborn more light, loose, and friable, as well as those which are very light, loose, and dry, more compact and moist, and those that are too wet drier, &c. In this view, moist stiff land is the most improved by light Manures, which open and loosen its particles; very light land by the more heavy and moist sorts; and wet land by dry light composts. Some soils also require Manure annually, while others only once in two or three years. See *DUNG*, &c.

The most proper sorts of Manure for the use of the kitchen-garden are those of the stable, cow, sheep, and pigeon dung, soot, lime, loamy marle, shell marle, sea-weed, wood, whin, fern, and coal ashes, the vegetable mould of decayed tree-leaves, and decayed vegetables of all kinds, as cabbage leaves, haulm, weeds, &c. And to these may be added the fluid substance which drains from dunghills, which is capable of affording the nutrition of plants in a very high degree, from the large proportion of carbonaceous matter that it contains.

These materials may be applied either in a simple or compound state; but the latter method is probably in general the most eligible; as it is supposed by some, that if they have not undergone a proper degree of fermentation, they have the effect of giving a rank and disagreeable flavour to some fruits and vegetables; and when a large quantity is applied, of producing a considerable degree of unwholesome-

ness, tainting the juices of the plants. This effect is, however, much to be disputed, since the different substances are changed and elaborated in the vessels of the vegetables before they become fit for the purpose of their increase.

The author of the *Scotch Forcing Gardener* asserts that "a combination of stable dung, sea weed, lime, and vegetable mould, which has lain in a heap for three or four months, and has been two or three times turned during that period, will make an excellent Manure for most kinds of garden land." Also that of "cow dung and sheep dung, mixed with soot or any of the kinds of ashes;" and that "pigeon dung, marle, and vegetable mould, well mixed, will make an excellent Manure for heavy land; or even for lighter soils, provided the pigeon dung be used sparingly." But that "pigeon dung, lime, soot, ashes, &c., should never be applied in a simple state: the quantity of them required being comparatively small, and the regular distribution difficult without the admixture of other matter. He further observes, that he has "witnessed the astonishing effects of whin ashes alone, in producing herbage in a five or six fold degree; which was the more obvious, on account that the field on which they were applied was much alike in quality (a stiff, wet, clayey loam), and the ashes applied partially. The effect was visible for several successive years. Also, on the timber trees with which the field was afterwards planted." He conceives that "marle is an excellent Manure for almost any soil; and may be applied as a simple with as much propriety as any of the kinds of cattle dung, or even vegetable earth. The kind called shell marle is, he thinks, much to be preferred; and should be freely applied to strong lands, but sparingly to light: the loamy kind being best adapted to light lands."

When stable dung is used in a simple state, it "should not," he supposes, "be applied in too rank a state, nor should it be too much fermented. It should generally lie in a heap for two or three months; during which time it should be turned twice or thrice. A ton of it in this state is worth three that has been used in the hot-bed, and is a year old. This Manure, and indeed dung of any kind, when thus applied, should never be carried from the heap to the ground till it is to be dugged in; as, by its exposure to the air, the virtues evaporate, and it is the less effectual."

And when made use of in a simple condition, he imagines "the necessity of the instant application of sea weed after its landing, is even greater than the above case; as it instantly

corrupts, and its juices not only evaporate, but flow downwards, and are lost. If this Manure is used as a compound, the heap wherein it is compounded should be more frequently turned on its account, that none of the juices may be lost, but that the other part of the compost may absorb them."

In his opinion "vegetable mould may either be used in a simple or compound state, and may be applied with equal propriety to all soils. None can," says he, "be hurt by it in any degree; since almost every plant will grow luxuriantly in it entirely, without the aid of any soil or manure whatever." He considers Manures as having the effect of correcting tenacity, crudity, and porosity in soils, exciting their fermentation, communicating nutritive matter, and affording nourishment to the roots of plants, by which the vegetation and perfect growth of plants is promoted.

There are considerable differences in the materials made use of as Manures, in their affording their nutritious properties, some affording them much more readily and more abundantly than others. This is the case with animal, vegetable, and all such matters as are rich in mucilage, the saccharine principle, and calcareous earth, and which readily afford carbon, phosphorus, and some gaseous fluids, such as the carbonic acid gas, oxygen, &c. while others which are greatly deficient in all or most of these principles, or which do not part with them easily, are found by experience much less beneficial in promoting the growth of vegetables.

As the effects and importance of Manure are now generally acknowledged and understood, it would appear to be the indispensable duty of the gardener and cultivator to be particularly careful in the collection of it, and also to distribute it with the most skillful frugality. "For this purpose, it is suggested that a well, cistern, &c. should be contrived so as to collect the dunghill drainings; and that in the application of Manure of any kind, the greatest care should be taken to divide it equally, according to the quantity to be applied." And further, that "the dunghill may be considerably increased by throwing the haulm, stalks, and leaves of all vegetables into a common heap, letting them remain till well rotted, and afterwards, or in the process of collection, mixing them with lime, marle, ashes, soot, &c. Watering the whole frequently with the drainings of the dunghill, would also greatly enhance its value."

The ground of gardens may often be greatly ameliorated and improved by proper draining, before the manures are applied, and sometimes by the use of sandy, gravelly, and other similar

materials, that have the power of opening, and rendering it less close and adhesive.

MARANTA, a genus containing plants of the herbaceous perennial exotic kind.

It belongs to the class and order *Monandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters are: that the calyx is a three-leaved perianthium, lanceolate, small, superior: the corolla is one-petalled, ringent: tube oblong, compressed, oblique, bent in: border six-cleft: alternate outer segments ovate, equal, smaller; one of these the lowest, two the uppermost: two alternate, lateral, very large, roundish, representing the lower lip: uppermost small, two-parted: the stamina have membranaceous filaments, resembling a segment of the corolla: anthers linear, fastened to one edge of the filament: the pistillum is a roundish inferior germ: style simple, the length of the corolla: stigma obsoletely three-cornered, bent in: the pericarpium is a roundish capsule, obsoletely three-cornered, three-celled, three-valved: the seed single, ovate, wrinkled, and hard.

The species cultivated is *M. arundinacea*, Indian Arrow-root.

It has a thick, fleshy, creeping root, which is very full of knots, from which arise many smooth leaves, six or seven inches long, and three broad towards their base, lessening towards each end, terminating in points: they are of the consistence and colour of those of the reed, and stand upon reed-like foot-stalks, which arise immediately from the root: between these come out the stalks, which rise near two feet high; these divide upward into two or three smaller, and have at each joint one leaf of the same shape with the lower, but smaller: the ends of the stalks are terminated by a loose bunch of small white flowers, standing upon peduncles near two inches long: the flowers are cut into six narrow segments, which are indented on their edges; these sit upon the embryo, which afterwards turns to a roundish three-cornered capsule, inclosing one hard rough seed. It is a native of South America, flowering in June and July, in this climate.

The root washed, pounded fine, and bleached, makes a fine nutritive powder, which is made use of as food.

Culture.—These plants may be increased by dividing the roots and planting them in pots of light rich earth, in the spring, just before they begin to shoot, plunging them in the bark hot-bed of the stove, where they must be kept in general, being frequently refreshed with water, when in a state of growth, having free air, after they become of some strength.

They afford ornament and variety in stove collections.

• **MARIGOLD.** See *CALTHA*.

• **MARJORAM.** See *ORIGANUM*.

MARLE, a sort of fossile earthy substance, made use of for rendering stiff adhesive garden-lands more open and light.

It varies much in its nature, some being nearly of the nature of fuller's earth, and of a fat enriching quality, of which there are blue, gray, yellow, and red coloured; but the blue is esteemed the best. In other cases, it has the appearance of a kind of soft stone, or rather slate, of a blueish or gray colour, called stone or slate marle, being found commonly near river-sides, and the sides of hills, &c. and though hard when dug, easily dissolves by rain and frost. There are likewise calcareous, or shell and claymarles, the latter resembling a fat sort of clay or loam. The last sort is accounted good manure for improving light, loose, sandy, garden lands. See **MANURE**.

MARRUBIUM, a genus containing plants of the shrubby kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatae*.

The characters are: that the calyx is a one-leaved, salver-shaped perianthium, rigid, ten-streaked; mouth equal, patulous, often ten-toothed; toothlets alternate, smaller: the corolla one-petalled, ringent; tube cylindrical: border gaping, with a long tubular opening: upper lip erect, linear, bifid, acute: lower reflex, broader, half-three-cleft; the middle segment broader, emarginate, the lateral ones acute; the stamina have four filaments, shorter than the corolla, concealed beneath the upper-lip, two longer; anthers simple: the pistillum is a four-cleft germ: style filiform, of the same length and in the same situation with the stamens: stigma bifid: there is no pericarpium: calyx contracted at the neck, spread out at the mouth, inclosing the seeds: the seeds four, somewhat oblong.

The species cultivated are: 1. *M. Pseudo-Dictamnus*, Shrubby White Horehound; 2. *M. acetabulosum*, Saucer-leaved White Horehound.

The first rises with a shrubby stalk two feet high, dividing into many branches: the leaves are small, sitting pretty close to the stalks: the whorls of flowers not so large as those of the eighth sort: the rim of the calyx flat: the flowers white: the whole plant very hoary with a dense compact cotton. It is a native of the island of Candia, flowering from June to August.

The second species has the stems hairy, about

two feet high: the leaves heart-shaped, rough on their upper side, and hoary on their under, deeply serrate: the whorls large: the border of the calyx flat; segments many, membranaceous, angular, and rounded at the top: the corolla small, pale purple, scarcely appearing out of the calyx: upper lip erect. Martyn observes, that after flowering time the border of the calyx grows out till it becomes twice as long as the tube, is naked and membranaceous, not villose as in the first species. It is also a native of the island of Candia, flowering from June to August.

Culture.—These sorts are capable of being increased by planting cuttings of the young shoots or branches in a shady border in the early spring, as about April. When the plants are well rooted, they may be removed into the places where they are to remain in the early autumn, with earth about their roots; but it is better to raise them at once in the places where they are to grow: when they grow strongly they should be screened from hard frosts in winter.

They continue the longest in poor dry soils, from their having a less luxuriant growth.

They afford variety in the borders, clumps, and other parts of pleasure grounds.

MARSH-ELDER. See *VIBURNUM*.

MARSH-MALLOW. See *ALTHÆA*.

MARSH-MARYGOLD. See *CALTHA*.

MARTYNIA, a genus containing plants of the tender herbaceous flowery kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatae*.

The characters are: that the calyx is a five-cleft perianthium, unequal, shrivelling: the corolla one-petalled, bell-shaped: tube spreading, ventricose, gibbous below at the base, melliferous: border five-cleft, obtuse, spreading: segments almost equal; the lower straight, the lowest more erect, concave, crenate: the stamina have four filiform filaments, curved inwards; the rudiment of a fifth filament within the upper pair of stamens, short like a cusp: anthers connected-converging: the pistillum is an oblong germ: style short, simple, the length of the stamens: stigma two-lobed: the pericarpium is a woody oblong capsule, gibbous, quadangular, two-furrowed on each side, acuminate, with the tip bent back, opening two ways, four or five-celled, inclosing the seeds as in a four-celled nucleus: the seeds several, oblong, berried.

The species cultivated are: 1. *M. diandra*, Two-stamened Martynia; 2. *M. prostrata*, Hairy Martynia; 3. *M. perennis*, Perennial Martynia.

Other species may be cultivated.

The first is a handsome large plant, two feet high, straight, with large leaves, viscid, from small, slender, simple, white, villose hairs, each of which has a pellucid clammy globule at the top: the stem single, round, reddish green: the branches several, brachiate, dichotomous: the root-leaves none: the stem-leaves opposite, angular, with teeth remote by a long sinus, flaccid, green, white from the closeness of the villose hairs, veined; the largest six inches long: petioles on the stem horizontal, on the branches spreading, the same length with the leaf: the flowers several, on short peduncles, hanging down, so that the throat is turned towards the ground, disposed in a thyrse in the forks of the branches, two inches and a half long. It is a native of La Vera Cruz, in New Spain.

The second species is a large plant, two feet high, flexuose, herbaceous, villose, viscid: the stem single, round, pale green: the branches several, scattered, resembling the stem: the root-leaves none: the stem-leaves opposite and alternate, stiffish, waved, veined, yellowish green, five inches long: the petioles horizontal, slightly channelled above, the length of the leaf: the flowers several, peduncled in a loose thyrse in the forks of the branches, two inches long. It is a native of America, flowering from June to August.

The third has a perennial root, thick, fleshy, divided into scaly knots, somewhat like those of Tooth-wort: the stems annual, about a foot high, thick, succulent, purplish: the leaves are oblong, thick, sessile, rough, and of a dark green, on their upper-side, but purplish underneath: the stem is terminated by a short spike of blue bell-shaped flowers, not spreading open so much at the rim as in the first sort. It is a native of Carthagera, in New Spain.

Culture.—The two first sorts may be increased by sowing the seeds in pots filled with light rich mould, in the spring, plunging them in a bark hot-bed, giving water frequently. When the plants have attained a little growth, they should be removed into separate pots of the same sort of earth, replunging them in the bark bed, giving due water and shade, till they become properly rooted, when they must have free air in fine weather: after they are a little advanced in their growth, they should be removed into larger pots, and be replaced in the bark bed in the stove, due room being allowed them. They should be constantly kept in this situation, and be duly watered and supplied with fresh air in warm weather.

The third sort may be raised by dividing the roots, and planting them in the spring about the middle of March, in pots of light rich earth,

and plunged in the bark-bed of the stove. When the plants are up, they should be duly watered in a slight manner, and in warm weather fresh air be freely admitted, keeping them from being shaded by other plants.

The cuttings of the shoots of the young stems planted in pots, and managed in the above manner, will also take root and form plants.

They afford ornament and variety among other stove plants.

MARVEL OF PERU. See MIRABILIS.

MARYGOLD. See CALENDULA.

MASSONIA, a genus containing plants of the herbaceous bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexamiria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla has six lanceolate petals, spreading, upright, placed externally on the nectary, which is inferior, cylindrical, membranaceous, six-streaked, six-toothed: the stamina six, filiform, incurved, a little longer than the petals, inserted into the teeth of the nectary: anthers ovate, upright, yellow: the pistillum is a superior germ (in respect of the nectary): style awl-shaped, declining, the length of the stamens: stigma simple, acute: the pericarpium is a three-sided capsule, thickening above, obtuse, smooth, three-celled, three-valved, opening longitudinally at the corners: the seeds very many, angular-globular, and smooth.

The species cultivated are: 1. *M. latifolia*, Broad-leaved Massonia; 2. *M. angustifolia*, Narrow-leaved Massonia.

The first has the leaves next the root, one pair, smooth and even: the flowers aggregate, sessile, without any scape: the fruit not berried, but a membranaceous capsule; in which it differs from *Hæmanthus*. It is a native of the Cape, flowering in March and April.

The second species has the same structure; but the leaves are narrow, of an oblong-lanceolate form, and the segments of the corolla bent back at the end; whereas in the first they spread straight out. It is a native of the Cape, flowering in March and April.

Culture.—They may be increased by planting the off-sets from the roots, when the leaves drop off, in pots of sandy earth, plunging them in a hot-bed in the stove.

They are likewise capable of being raised from seeds sown in pots of the same sort of earth, plunging them in a hot-bed.

The plants should afterwards have a free air in the green-house, where they must be kept.

They afford variety in these collections.

MASTICK TREE. See **PISTACIA**.

MAT, GARDEN, a sort of covering formed of bass, which is much used in gardening, for sheltering various sorts of plants in winter and spring, in frosty and other cold weather; and in summer for shading many sorts of young or tender kinds occasionally from the sun; and many other purposes in the different garden departments.

They are of different sorts in regard to size and substance, there being small, middling, and large sizes: but for general use, those called **Russia Mats** are superior, both in size, substance, and durability. It may also be proper to have some of the smaller or middling sizes for particular occasions, and small gardens, in which, for some purposes, they may be more convenient than large ones. They are sold by most of the principal nursery and seedsmen, at from six or eight to twelve or fifteen shillings per dozen, according to size and strength.

They are also of essential use in all hot-bed work, for covering or spreading over the lights or glasses of the frames in the nights, in winter and spring, to exclude the external night cold; also occasionally in the day time in very severe weather, and heavy falls of snow or rain.

Likewise for occasionally covering several sorts of small young esculent plants with, in the full ground in beds and borders, in these seasons; as young lettuces, cauliflowers, small-sallad herbs, early radishes, &c. in the open beds, and under frames and hand-glasses, to defend them from cutting frosts, snow, and other inclement weather: and sometimes in raising, transplanting, or pricking out small or moderate portions of particular sorts of plants, both of the hardy and tender kinds, whether of the esculent or annual flowery kinds in the spring, on beds or borders of natural earth, or in hot-beds, without frames, by being arched over with hoops or rods. They are likewise extremely useful in the spring and summer, in hot, dry, sunny weather, in shading several sorts both in seed-beds before and after the young plants are come up, and in beds of pricked-out small young plants, to shade them from the sun till they take fresh root; as also for shading the glasses of hot-beds occasionally, when the sun is too powerful for particular sorts of plants in the heat of the day, as in Cucumbers, Melons, and various other kinds.

In kitchen and other garden districts furnished with wall-trees, they are of great use in spring to cover the trees of particular sorts with when in blossom, and when the young fruit is setting and advancing in its early growth after the decay and fall of the bloom; by which assistance, in cold winters and springs, when sharp frosts

sometimes prevail, a tolerably good crop is often saved, while in trees fully exposed the whole is cut off by the severity of such weather.

In the flower-garden and pleasure-ground, Mats are also found useful on different occasions; in the former, in sheltering beds of curious sorts of choice flower-plants, and both in their advancing growth, to protect them from cold in winter and spring; and when in full bloom, to shade and screen the flowers from the sun and rain, to preserve their beauty more effectually, and to continue them longer in blow of a fine lively appearance; as well as to cover beds, &c. in raising various tender annual plants from seed in the spring; and in the latter occasionally in winter to defend some kinds of curious tender evergreens, &c. such as some of the *Magnolias*, *Broad-leaved Myrtle*, *Olive*, *Tea Tree*, &c. when standing detached and trained against walls.

And in nurseries, they are of considerable utility in the propagation and culture of numerous sorts of tender curious exotics, in defending them from cold, and shading from scorching sun, while they are in their minor growth, &c. They are necessary also for matting round bundles or baskets of tender or curious plants, when conveyed to a distance.

They are also of great use occasionally in severe winters on such glass-work as green-houses, hot-houses, forcing-frames, &c. in covering the glasses externally on the nights, and occasionally in the day time.

In using these Mats, when the ends are open or loose, they should be secured by tying the end threads or strings of the bass close and firm, otherwise they soon ravel out loose in that part, and are spoiled.

When made use of in the work of covering and shading, &c. they should generally in uncovering, if rendered wet by rain or snow, be spread across some rail, hedge, or fence, &c. to dry, before folding them together, that they may be preserved from rotting, otherwise they will not last long.

These Mats should never have any bass drawn out of them for tying up plants with, as is too commonly the practice, as by such means they are soon spoiled.

MATRICARIA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoidæ*.

The characters are: that the calyx is common hemispherical: scales linear, imbricate, almost equal, not scarious: the corolla compound radiate: corollets hermaphrodite, tubular, numerous,

in a hemispherical disk: females in the ray several: proper of the hermaphrodite funnel-form, five-cleft, spreading: female oblong, three-toothed: the stamina to the hermaphrodites have five capillary filaments, very short: anthers cylindrical, tubular: the pistillum to the hermaphrodites an oblong germ, naked: style filiform, the length of the stamens: stigma bifid, spreading: to the females germ naked: style filiform, almost the length of the hermaphrodite: stigmas two, revolute: there is no pericarpium: calyx unchanged: the seeds solitary, oblong, without any pappus or down, to both sorts of florets: the receptacle naked, and convex.

The species cultivated is *M. parthenium*, Common Feverfew.

It has a perennial or biennial root, composed of a great number of fibres, and spreading wide on every side: the stem from two to three feet high, erect, firm, round, striated, slightly hairy, branched on every side: the leaves petioled, alternate, pale green, soft and tender, pinnatifid with two or three pairs of ovate jagged pinnas, and a larger one terminating, three-lobed, wedge-shaped, the middle lobe trifid, the side-lobes notched, roughish, slightly hairy: when magnified they appear as if sprinkled with minute spangles: the flowering heads solitary, sometimes on simple, but oftener on branched peduncles, forming together a loose umbel or rather corymb, hairy; the peduncles are thickest just beneath the flower, and about two inches long. It is a native of many parts of Europe, flowering in June.

There are several varieties, as with full double flowers, with double flowers, having the florets of the ray plane, of the disk fistular; with very small rays; with very short fistular florets; with naked heads, having no rays; with naked sulphur-coloured heads, and with elegant curled leaves.

Culture.—These plants may be raised from seeds, by parting the roots and cuttings.

The seeds should be sown in the spring, as March, upon a bed of light earth, and, when they are come up, planted out into nursery-beds, at about eight inches asunder, where they may remain till the middle of May when they should be taken up, with a ball of earth to their roots, and planted in the middle of large borders, or other parts, for flowering.

They should not be permitted to seed, as it often weakens and decays the roots; therefore, when their flowers are past, their stems should be cut down, which will cause them to push out fresh heads, whereby the roots may be preserved.

MAURITIA, a genus containing a plant of the exotic tree kind.

It belongs to the *Appendix Palmæ*, and ranks in the natural order of *Palms*.

The characters are: that the male-flowers are in an oblong ament, covered all round with flowers, closely approximating, with blunt scales between the flowers: the calyx is a one-leaved, cup-shaped perianthium, truncated, entire, three-sided, short: the corolla is one-petalled: tube short, the length of the calyx: border three-parted: segments equal, spreading a little, lanceolate, rigid (in a manner woody), blunt: the stamina have six filaments inserted into the throat of the tube, thick, very short: anthers linear, angular, the length of the segments of the corolla; three alternate ones extended between the segments of the corolla, and horizontal; the three others are generally erect, and pressed close to the channel or the segments: female, unknown.

The species is *M. flexuosa*, Maidenhair Tree, or Ginkgo.

It is a singular tree, almost without leaves: the branches are angular, flexuose, smooth, with short joints, thickening upwards, somewhat recurved, terminated by embracing sheaths: with a cup-shaped and sharper knee joint: from the axils of these come out over the whole stem, strobile-shaped aments, in two rows, spreading very much, sessile, with two large upright scales, sickle-shaped upwards at the base: the aments ovate-oblong, cylindric, covered with closely approximating, ferruginous flowers, spreading very much; falling off and leaving the ament, with its scales. It is a native of the woods of Surinam.

Culture.—It may be increased by laying the young branches in the summer season, and when they have stricken root fully, taking them off and planting them with earth about their roots in pots filled with light fresh mould, placing them in the green-house, where they must be kept.

Cuttings of the young shoots may also be planted in pots in the same manner, plunging them in a moderate hot-bed till they have stricken root, when they may be managed as the other plants.

It affords variety in the green-house, and when trained against walls; but in the last case must be sheltered by mats, in severe weather in winter.

MEALY-TREE. See **VIBURNUM**.

MEDEOLA, a genus comprising plants of the herbaceous climbing kind.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx,

unless the corolla be called so: the corolla has six petals, ovate-oblong, equal, spreading, revolute: the stamina have six awl-shaped filaments, the length of the corolla: anthers incumbent: the pistillum has the germs, three-horned, ending in styles: stigmas recurved, thickish: the pericarpium is a roundish berry, three-cleft, three-celled: the seeds solitary and heart-shaped.

The species cultivated are: 1. *M. Virginiana*, Virginian Medeola; 2. *M. asparagoides*, Broad-leaved Shrubby Medeola; 3. *M. angustifolia*, Narrow-leaved Shrubby Medeola.

The first has a small scaly root, from which rises a single stalk, about eight inches in height: there is one whorl of leaves, at a small distance from the ground, and at the top are two leaves, standing opposite: between these, come out three slender peduncles, which turn downwards, each sustaining one pale herbaceous flower, with a purple pointal. It is a native of Virginia, flowering in June.

The second species has the root composed of several oblong knobs, which unite at the top, like that of the *Ranunculus*; from which arise two or three stiff winding stalks, dividing into branches, and rising four or five feet in height, when they meet with support: the leaves are sessile, ending in acute points, of a light green beneath, but dark above: the flowers come out from the sides of the stalks, singly, or two on a slender short peduncle: the petals are dull white. It flowers in the beginning of winter, and the seeds become ripe in the spring. It is a native of the Cape.

The third has a root like the second, but the stalks are not so strong; they climb higher, but do not branch so much: the leaves are much longer and narrower, and are of a grayish colour: the flowers come out from the sides of the branches, two or three upon each peduncle: they are of an herbaceous white colour, shaped like those of the second sort, appearing about the same time; but have not produced fruit in this climate. It is likewise a native of the Cape, flowering from December to March.

Culture.—These plants may be increased by planting offsets, taken from the roots in the summer season, about July, in pots filled with good rich light mould, remaining in the open air till autumn, when they should be removed into the green- or hot-house; but the latter when intended to fruit. While the plants have a vigorous growth, they should be frequently refreshed with water; but as the stems decay, very little, especially when placed in an eastern aspect.

The second and third sorts may be raised from seeds, but they commonly remain long in the earth before they come up.

The first sort is sufficiently hardy to stand in the open air during winter.

They afford variety in green-house and stove collections, in the winter season.

MEDICAGO, a genus furnishing plants of the shrubby evergreen and herbaceous annual kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianthium, straight, campanulate-cylindrical, half-five-cleft, acuminate, equal: the corolla papilionaceous: banner ovate, entire; the margins bent in, the whole bent back: wings ovate-oblong, affixed by an appendage to the keel, with the sides converging under the keel: keel oblong, bifid, spreading, blunt, bent down from the pistil, and gaping from the banner: the stamina have diadelphous filaments, united almost to the tops: anthers small: the pistillum is a pedicelled oblong germ, curved in, compressed, involved in the filaments, starting from the keel, bending back the banner, ending in a short, awl-shaped, almost straight style: stigma terminating, very small: the pericarpium is a compressed legume, long, bent in: the seeds several, kidney-shaped or angular.

The species cultivated are: 1. *M. arborea*, Tree Medick, or Moon Trefoil; 2. *M. polymorpha*, Variable Medick, or Snail and Hedge-hog Trefoil.

The first is a shrub growing to the height of from four or five to eight or ten feet, and being covered with a gray bark, the whole has a hoary appearance: the stem divides into many branches, with ternate leaves at each joint, on foot-stalks about an inch in length: there being several of these leaves together, the whole shrub is closely covered with them; and it is never destitute of leaves: the component leaflets are small, lanceolate, (or wedge-shaped, emarginate,) and hoary on their under side: the flowers are produced on peduncles from the side of the branches, four or five together, and are of a bright yellow: the pods contain three or four small seeds. It flowers a great part of the year, and when sheltered is seldom destitute of them; beginning in the open air to flower in April, and continuing till December.

It grows in great plenty in Abruzzo, and Naples.

The second species has an annual, oblong, branched root; the stems more or less procum-

bent, somewhat angular, hoary, from a hand to a foot in length, ternate: leaflets roundish, retuse, subserrate, glaucous-green, petioled: the upper ones smaller, soft, tomentose: the stipules entire or toothed, sessile, in pairs at the base of the petioles: the peduncles axillary, much longer than the leaves, round, pubescent, forming a spike: flowers very small, commonly yellow: the calyx smaller than the corolla, hirsute, green-hoary: the legumes shell-snailled, small, one-celled, of different shades of brown or blackish when ripe, ciliate, aculeate or naked: the seeds ovate, smooth, convex on one side, flat on the other, lemon-coloured. It is a native of the South of Europe.

There are numerous varieties and subvarieties, but the principal are: the Common Snail Medicago, with large smooth pods, shaped and twisted like a snail: the Hedge-hog Medicago, with large prickly snail-shaped pods, armed with spines pointing every way like a hedge-hog; with turbinate pods; with globular pods; with orbicular pods; with long crooked pods; with double pods; with clustered pods; with twisted pods; and with jagged leaves.

Culture.—The first sort may be raised from seeds or cuttings.

The seeds should be sown in the early spring, on a warm border, or in pots of light mould, and plunged in a moderate hot-bed, till the plants have attained a little growth; when they should be gradually hardened to the full air. In both methods the plants should be kept clean, and have protection in the following winter from frost, and in the spring they should be planted out, some into pots to have the management of green-house plants, and others into the borders and nursery-rows, in dry warm situations, the former to remain, and the latter to be occasionally transplanted.

When they are increased by cuttings, they should be planted on a bed of light rich earth, or in pots of the same sort of mould, and plunged in a moderate hot-bed, due shade and water being given; and when they have formed good roots, in the autumn they may be removed into other pots or the situations in which they are to remain, shading and watering them till they are well rooted, when they should be trained up to sticks, to have straight stems and regular heads, their irregular shoots being annually pruned to keep them in order. These plants are found to grow stronger and flower better when kept in warm situations in the open air, than when managed as green-house plants. They should, however, be sheltered in very severe winters.

The second sort and varieties may be raised from

VOL. II.

seed, which should be sown in the early spring months in the places where the plants are to remain, in patches of several seeds, afterwards thinning the plants to two or three of the best, when they require no further culture. It is the double sorts that are chiefly cultivated in the garden.

They both afford variety in the borders and other parts, and the former in the green-house.

MEDLAR. See MESPILUS.

MEDUSA'S HEAD. See EUPHORBIA.

MELASTOMA, a genus containing plants of the evergreen tree and shrub exotic kinds.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leaved, bell-shaped perianthium, ventricose at the base, four or five-cleft, permanent: the corolla has four or five roundish petals, inserted into the throat of the calyx: the stamens have eight or ten filaments, inserted into the calyx, short: anthers long, somewhat curved, upright, one-celled, gaping at top with an oblique hole: scalelets two, very small, diverging, annexed to each filament below the anther, the rudiment of another cell: the pistillum is a roundish germ, in the belly of the calyx: style filiform, straight: stigma blunt or headed: the pericarpium is a two-, three-, four-, or five-celled berry, wrapped up in the calyx, roundish, crowned with a cylindric rim: the seeds very many and nestling.

The species cultivated are: 1. *M. grossularioides*, American Gooseberry of Surinam; 2. *M. holosericea*, Satiny-leaved Melastoma of Brazil.

Other species may be cultivated for variety.

The first seldom grows more than seven or eight feet high, spreading out into many slender branches, covered with a smooth purple bark: the leaves are lanceolate, five inches long, and two broad in the middle, smooth on both sides, entire, acute-pointed: the flowers are produced in pretty long hanging bunches, of an herbaceous colour, with styles stretched out a good length beyond the petals, and permanent: the fruit small and black when ripe. It is a native of Surinam.

The second species has a shrubby stem, rough-haired, with membranaceous corners: the leaves cordate at the base, acuminate, whitish underneath, nine-nerved, with three nerves thicker: the racemes opposite, subdivided, with a sessile flower in the forkings: the last pedicels three-flowered: the corollas rather large: the calyx oblong, five-cleft; segments lanceolate,

O

acute: the petals five, obovate, roundish, blunt, spreading, longer than the segments of the calyx, violet-purple: the filaments ten, the length of the corolla, filiform, purple: the anthers very long, sickle-shaped: the germ oblong: the style long and curved: the stigma thickish: the fruit a berry. It is a native of Brazil.

Culture.—These plants are best obtained by having the entire fruits put up in their native places in dry sand as soon as ripened and immediately forwarded, which as soon as they arrive should be taken out, and the seeds sown in pots of light earth, plunging them in a moderate hot-bed of tanner's bark: when the plants are up, and fit to remove, they should be planted each in a small pot of light earth, re-plunging them into the tan-bed.

They afterwards require the management of other woody stove plants.

They may also be increased by laying the young branches in the spring and by planting cuttings of the young shoots in the summer season in pots, and plunging them in a hot-bed. They must afterwards have the same culture as the others.

MELIA, a genus containing plants of the deciduous and evergreen exotic tree kinds.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Trihilatae*.

The characters are: that the calyx is a one-leaved perianthium, very small, five-toothed, upright, blunt: the corolla has five linear-lanceolate petals, spreading, long: nectary cylindric, one-leaved, the length of the corolla, with a ten-toothed mouth: the stamina have ten filaments, very small, inserted within the apex of the nectary: anthers not exceeding the nectary, oblong: the pistillum is a conical germ: style cylindric, the length of the nectary: stigma capitate, with five converging valves: the pericarpium is a globular soft drupe: the seed a roundish nut, five-grooved, five-celled.

The species are: 1. *M. Azedarach*, Common Bead-tree: 2. *M. sempervirens*, Evergreen Bead-tree; 3. *M. Azadirachta*, Indian Evergreen Bead tree.

The first, in its native situation, grows to a large tree, spreading out into many branches: the leaflets are notched and indented on their edges, deep green above, and paler underneath: the flowers come out from the side of the branches in long loose bunches: the petals are blue: the fruit oblong, the size of a small cherry, green at first, but when ripe changing to a pale yellow: the nut four- or five-celled, with one oblong seed in each cell. It flowers in

July, but seldom produces seeds: it drops the leaves in autumn, and puts out fresh ones in the spring: the pulp surrounding the nut is said to be poisonous. The nuts are bored and strung for beads. It is a native of Syria.

The second species, which has generally been regarded as a variety, is thought by Swartz to be a distinct species, differing from that in being smaller and often flowering for two years together: the leaflets, which are bright green, are seldom more than seven, wrinkled a little, deeper and more unequally serrate and acuminate. It is a native of the East Indies.

The third becomes a large tree in India. The stem is thick, the wood of a pale yellow, and the bark of a dark purple colour, and very bitter: the branches extend wide on every side: the leaves are composed of five or six pairs of oblong acute-pointed leaflets, terminated by an odd one; they are serrate, of a light green colour, and of a strong disagreeable odour; they stand upon pretty long foot-stalks, opposite, or alternate: the flowers are produced in long branching panicles from the side of the branches: they are small, white, and sit in small calyxes, cut into five acute segments: fruit oval, the size of small olives, green, turning yellow, and when ripe changing to purple: the pulp is oily, acid, and bitter: the nut is white, and shaped like that of the former.

Culture.—These plants are all capable of being increased by seeds, which in the first sort are obtained from abroad, and should be sown in pots of light rich earth in the spring, plunging them in a hot-bed of tanner's bark or dung, under frame and glasses, giving frequent waterings and fresh air when the plants are come up, being fully exposed in a moderate shade, during the summer, and placed under a frame in the autumn, &c. to have the free air all winter in open weather, and be sheltered from east.

In the following March they may be planted in separate small pots, plunged in a bark-bed, &c. Though this last is not absolutely necessary, when practised it greatly facilitates their rooting and early growth.

When they have been thus managed for three or four years, and shifted occasionally into larger pots; some of the strongest and most woody plants may be planted out in the full ground under a warm wall, or in a dry sheltered part of the shrubbery. The proper season for this work is the first fortnight in April.

Some plants should likewise be placed in pots, to have the management of green-house exotic plants, lest those in the open ground

should be destroyed by the frost during the winter season.

In the second and third sorts, the seeds should be sown in pots and plunged in the bark-bed, and managed nearly as the first sort; but, as being much more tender, must be always kept in pots, and plunged in the tan-bed in the stove during their early growth; afterwards, when they have acquired considerable size and strength, they may be placed in the open air for a month or two in the heat of summer, but the rest of the year be kept in the hot-house: managing them as other woody exotic stove plants.

The last sort is not common in the gardens.

The first sort is proper for shrubberies and other parts in warm situations as well as for the green-house, and the others for stove collections.

MELIANTHUS, a genus containing plants of the perennial exotic kind.

It belongs to the class and order *Didymia Angiospermia*, and ranks in the natural order of *Corydalis*.

The characters are: that the calyx is a large perianthium, five-parted, coloured, unequal: the two upper segments oblong, erect; the lowest very short, like a bag, gibbous downwards; the middle segments opposite interior, lanceolate, the uppermost simple, erect: the corolla has four petals, lanceolate-linear, with the tops reflex, from parallel spreading, turned outwards, forming the lower lip, as the calyx itself does the upper, connected at the sides in the middle: nectary one-leaved, placed within the lowest segment of the calyx, and fastened to it with the receptacle, very short, compressed at the sides, gashed at the edge, turned downwards by the back: the stamina have four awl-shaped filaments, upright, the length of the calyx; the two lower shorter, united at the base: anthers cordate-oblong, four-celled in front: the pistillum is a four-cornered germ, gibbous, four-toothed: style upright awl-shaped, of the same length, and in the same situation with the stamens: stigma four-cleft, with the upper segment larger: the pericarpium is a quadrangular capsule, half-four-cleft, angles sharp, distant: cells inflated: partitions open in the centre for a receptacle of the seeds, gaping between the angles: the seeds in fours, subglobose, annexed to the centre of the capsule.

The species cultivated are: 1. *M. major*, Great Honey-flower; 2. *M. minor*, Small Honey-flower.

The first has a woody, perennial, spreading root: the stems many, woody, four or five feet high, herbaceous towards the top: the

leaves large, embracing the stem at the base, where they have a large single stipule fastened on the upper side of the foot-stalk, with two ears at the base, which also embrace the stem: the leaves have four or five pairs of very large leaflets, deeply jagged into acute segments; and between them runs a leafy jagged border or wing along the upper side of the midrib, so as to connect the leaflets at the base; they are of a gray colour: the spikes are pretty long, springing from between the leaves towards the top of the stalks: the corolla is brown or chocolate colour. It has been remarked by Linnaeus, that when shaken while in flower it distils a shower of nectar. It is a native of the Cape.

The second species rises with round, soft, woody stalks; five or six feet high, sending out two or three branches from the sides: the leaves are not half so large as those of the preceding, deep green on the upper, and whitish on the under side: the flowers come out from the side of the stalks in loose hanging panicles, each sustaining six or eight flowers, smaller than those of the first sort: the lower part of the petals is green, the upper saffron-coloured, and on the outside, in the swelling part of the petals, is a blush of fine red. Mr. Curtis remarks, that the stem, which is shrubby, during the flowering season is apt to exhibit a naked appearance, having then fewer leaves on it, and those not of their full size: that the foliage has an unpleasant smell; and that the nectar does not flow so copiously as in the large sort, but is retained at the bottom of the corolla, and is of a dark brown colour. It is a native of the Cape.

Culture.—These plants may be increased by suckers from the roots and cuttings of the young stalks or branches.

The first sort is best raised by planting the suckers or side-shoots, any time in the spring or summer seasons, choosing such as are furnished with root fibres, in pots, or the places where they are to remain, which, after they are planted and have taken root, require little further care but to keep them clean from weeds. The cuttings may be planted during any of the summer months, due water and shade being given. When they have taken root they should be planted out where they are to remain, or in separate pots, to be managed as green-house plants.

The second sort is raised with more difficulty, and chiefly from cuttings, which should be planted upon an old hot-bed, the heat of which is over, and covered close with bell- or hand-glasses to exclude the air. When they have

taken root they may be planted out in pots and sheltered in the winter under a frame for a year or two till they are become strong, after which they may be set out in a warm border, and be managed in the same manner as the first sort.

They succeed best in a dry soil and warm situation; but some plants should always be kept in pots and treated as green-house plants, lest those in the open ground be destroyed by severe frosts.

They afford ornament and variety in the borders and clumps, as well as among other plants in the green-house.

MELISSA, a genus containing plants of the hardy herbaceous, fibrous-rooted perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatae*.

The characters are: that the calyx is a one-leaved perianthium, subcampanulate, dry-scarious, spreading a little, angular, striated, permanent, with a two-lipped mouth: upper lip three-toothed, reflex-spreading, flat; lower lip shorter, sharpish, two-parted: the corolla one-petalled, ringent: tube cylindrical: throat gaping: upper lip shorter, erect, arched, roundish, bifid: lower lip trifid: middle segment larger, cordate: the stamina have four awl-shaped filaments; two the length of the corolla, two shorter by half: anthers small, converging in pairs: the pistillum is a four-cleft germ: style filiform, the length of the corolla, inclining along with the stamens beneath the upper lip of the corolla: stigma slender, bifid, reflex: there is no pericarpium: calyx larger, unchanged, fostering the seeds in its bosom: the seeds four, ovate.

The species cultivated are: 1. *M. officinalis*, Official or common garden Baum or Balm; 2. *M. grandiflora*, Great-flowered Baum; 3. *M. Cretica*, Cretan Baum; 4. *M. fruticosa*, Shrubby Baum.

The first has a perennial root, and an annual stalk, which is square, branching, from two to three feet high: the leaves by pairs at each joint, two inches and a half long, and almost two inches broad at the base, growing narrower towards the top, indented about the edges; the lower ones upon pretty long foot-stalks; flowers grow in loose small bunches from the axils in whorls, upon single peduncles: they are white, or yellowish, and appear in July. It is a native of the southern parts of Europe.

It varies, with variegated leaves, and with the stalks slender, the leaves much shorter, the whole plant hairy, and of a strong disagreeable

odour: the flowers in whorls, sitting pretty close to the branches, and smaller than those of the common sort. This is the Roman Baum.

The second species has a perennial root and an annual stalk, rising about a foot high: the leaves in pairs at each joint, an inch and a half long, and three quarters of an inch broad, serrate, of a lucid green on the upper side, and whitish on the under: single peduncles come out from the axils, half an inch long, and dividing into two smaller ones, each sustaining two flowers upon short separate pedicels: the flowers are large, of a purple colour. It flowers in June, ripening seeds in August, and is a native of Tuscany, &c.

There are varieties with white flowers; with red flowers; and with variegated leaves. They are all inferior to the purple.

The third has slender stems, low, straight, a little woody, and dark purple: the leaves are small, roundish, hoary: the flowers small and white, appearing in June; the seeds ripen in autumn. It seldom continues more than two or three years, and is a native of the South of Europe.

The fourth has also slender shrubby stems, about nine inches long, putting out small, opposite side-branches: the leaves small, hoary, ovate-acuminate: the flowers are in whorled spikes at the end of the stalks: they are small and white or pale purple, appearing in July, and ripening seeds in autumn. The whole plant has a strong scent of pennyroyal, and is of short continuance.

Culture.—The first and second sorts may be readily increased by parting the roots and planting them out in the early autumn, as October, time enough for the offsets to be established before the winter frosts come on. They should be divided into small pieces with three or four buds to each, and the first sort planted two feet a-part in beds of common garden earth, and the second sort in the borders or other parts singly, in larger offset slips. The only culture they afterwards require is to keep them clean from weeds, and to cut off the decayed stalks annually in autumn, digging or stirring the ground between the plants in the common sort.

The third sort may be raised by sowing the seeds in the autumn or spring, or where the seeds are permitted to scatter there will be a sufficient supply of young plants.

The fourth species may also be increased by seeds sown in the spring on beds or in pots, or by cuttings planted in the same manner, in any of the summer months, and shaded from the sun.

They frequently live through the winter in warm borders; but it is always proper to keep a plant or two in pots, sheltered under a frame during that season.

The first sort is useful for various domestic purposes, and the others ornamental in the borders, clumps, and other parts, as well as affording variety among potted plants.

MELITTIS, a genus containing a plant of the flowery perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillata*.

The characters are: that the calyx is a one-leaved perianthium, bell-shaped, round, straight, with a two-lipped mouth: upper lip higher, emarginate, acute; lower shorter, bifid, acute, with the divisions gaping: the corolla one-petalled, ringent: tube much narrower than the calyx: opening scarcely thicker than the tube: upper lip erect, roundish, entire: lower spreading, trifid, blunt; middle segment larger, flat, entire: the stamina have four filaments, awl-shaped, under the upper lip, the middle ones shorter than the two outer: anthers converging by pairs in form of a cross, bifid, blunt: the pistillum is a blunt germ, four-cleft, villose: style filiform, the length and situation of the stamens: stigma bifid, acute: there is no pericarpium: calyx unchanged, containing the seeds at the bottom: the seeds four.

The species cultivated is: *M. Melissophyllum*, Bastard Baum.

It has a perennial root, sending up in the spring three, four, or more stems, a foot and a half high or more, upright, with a few branches at the base: the whole plant is hairy: the leaves opposite, petioled, ovate, elliptic, or ovate-lanceolate, somewhat pointed, unevenly and bluntly serrate, the serratures terminating in purplish glands, slightly villose, wrinkled: petioles channelled above, hirsute, united at the base; the flowers large, handsome, growing chiefly on one side, in half whorls, about six flowers together, of a purplish white colour. It is a native of several parts of Europe, flowering in May or June.

Much honey is secreted from a gland that encircles the base of the germ; it is a favourite plant with bees.

There is a variety smaller in all respects, with the leaves ovate and heart-shaped, the flowers not so large, and usually of a pale red, but sometimes white, which is a native of Switzerland, &c.

Culture.—These plants are capable of being increased by parting the roots and planting them out early in the autumn where they are to

remain. The roots should not be parted oftener than every third year. When seeds can be procured, they may also be raised by sowing them in the early spring, where they are to remain. The plants succeed best in a loamy soil and eastern aspect.

They afford ornament in the borders and other parts of pleasure-grounds.

MELON. See CUCUMIS.

MELON-GROUND, the space or portion of ground in the kitchen-garden, or other place, appropriated to the culture of Melons and other vegetables that require artificial heat. See GARDEN, and MELONARY.

MELONARY, the portion of ground in the kitchen-garden principally allotted for the business of early and general hot-bed work, in the culture of Melons and Cucumbers as well as occasionally in other framing culture.

These places are mostly inclosed by some sort of fence, and are particularly convenient and useful, as in the practice of hot-bed culture there is unavoidably a considerable littering occasioned at times, by means of the necessary supplies of hot-dung, straw, litter, and other materials, both in the making of the beds and after-culture; which by this means being confined to a particular part, the whole is performed more conveniently, and without incommoding the œconomy of the other parts of the garden.

They are also very useful when properly chosen in the driest and warmest situations, in the advantage of having the hot-beds on dry ground, and sheltered from cutting winds, with the full benefit of the whole day's sun, as well as in being more secure.

In considerable gardens, the places allotted for this use are sometimes of such extent, as to have the hot-houses, or forcing-houses, and other appurtenances of that kind, where culture by artificial heat is required, near together, by which time and trouble is saved.

In the choice of a place for this purpose, some part of the warmest, best-sheltered, dry quarter of the garden, which is well defended from the northerly and north-easterly winds, and where the ground is dry at all seasons, not liable to inundation or the stagnation of water, and conveniently situated for bringing in dung, tan, earth, &c., should be fixed upon.

And if, with these advantages, it lies rather a little higher or very gently sloping towards some lower part, it will be more proper, especially when towards the full sun from rising to setting, so as to admit of ranging the hot-beds longitudinally east and west, or as nearly in that direction as possible. See GARDEN.

The extent or dimensions must be according to

the quantity of hot-bed framing required, as from two or three, to ten, twenty, or thirty frames, or more; and sometimes also for hot-bed ridges for hand-glasses in the same proportions. They may of course be from two or three to five or ten rods square, or to that of a quarter, or half an acre, or more; in which, besides the part immediately allotted for the hot-beds, it is convenient to have room for the previous preparation of the dung, &c. as well as for compost, heaps of earth, &c. in preparation for earthing the hot-beds.

In respect to form, the most eligible shape is that of square, either an equal or an oblong square.

When inclosed, the fences may be six, seven, or eight feet high in the northerly or back part and five or six in front, the sides corresponding, though when extensive they may be nearly of equal height all round.

The internal part, or immediate place for the hot-beds, even when dry, should be a little elevated to throw off the falling wet of heavy rain, &c.; and when unavoidably low, or liable to be wet in winter or spring, be raised, with some dry materials, considerably above the general level, that the hot-beds may stand dry, as well as to afford advantage in performing the business of culture.

The ground for the immediate place of the hot-beds may generally remain even or level; some however form shallow trenches, the width and length of the intended hot-beds, as from six to twelve inches deep, and make the lower part of the bed in the trench; which, however, is more proper in a dry or somewhat elevated situation than in low or wet ground, as water is apt to settle in the bottom, and chill the beds, occasioning the heat to decline suddenly.

Besides, by having the hot-beds wholly above-ground, there is a better opportunity of applying the occasional linings quite from the bottom upwards. See GARDEN, and CUCUMIS.

By proper attention in the construction of the different parts of these grounds and in the building of the fences, they may also be rendered highly useful in raising various kinds of fruit.

MELON-THISTLE. See CACTUS.

MELOPEPO. See CUCURBITA.

MENISPERMUM, a genus containing plants of the hardy climbing kind.

It belongs to the class and order *Dioecia Decandria*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that the male has the calyx a two-leaved perianthium: leaflets linear, short: the corolla petals outer six, ovate, spreading, equal, inner eight, obcordate, concave, smaller than the outer, four of them in the inner row wider:

the stamina have sixteen filaments, cylindric, a little longer than the corolla: anthers terminating, very short, bluntly four-lobed: female; calyx and corolla as in the male: the stamina have eight filaments, like those of the male: anthers pellucid, barren: the pistillum has two or three germs, ovate, curved inwards, converging, pedicelled: styles solitary, very short, recurved: stigmas bifid, blunt: the pericarpium has two or three berries, roundish-kidney-form, one-celled: the seeds solitary, kidney-form, large.

The species cultivated are: 1. *M. Canadense*, Canadian Moon-seed; 2. *M. Virginicum*, Virginian Moon-seed; 3. *M. Carolinum*, Carolina Moon-seed.

The first has a thick woody root: the stems many, climbing, becoming woody, and rising to the height of twelve or fourteen feet, twisting themselves about the neighbouring plants for support: the leaves are large, smooth, with the footstalk almost in the middle, and a hollow there on the upper side: the flowers come out in loose bunches from the side of the stem: they are of an herbaceous colour, small, and composed of two rows of oblong oval petals: the stem twines in a direction contrary to the sun's apparent motion, and is smooth and even. It is a native of Canada, &c., flowering in June and July.

The second species differs from the first in the shape of the leaves, which are angular and sometimes heart-shaped, but not peltate, having the footstalk at the base: the stems become woody, and rise nearly as high as those of the first sort: they are round, slender, twining: the leaves are alternate, bright green, the form, colour and consistence of Ivy-leaves, on the upper part of the stem entire, as on old Ivy; on the middle and lower part not unfrequently angular, as in young Ivy; although they have very slender hairs on them, yet they have the appearance of being smooth and shining, especially the younger leaves, for the older ones are subhirsute and less shining; underneath they are of a paler green. The flowers and berries differ little from the first sort. It is a native of Virginia, &c.

The third differs from the second sort in its branches not becoming woody as in that: the stems are herbaceous, the leaves entire and hairy, and not more than half so large; nor is the plant so hardy, so that it does not produce flowers in this climate, unless the season be very warm. It is a native of Carolina.

Culture.—The first and second sorts are easily propagated by laying down the branches in the autumn season, and when the layers have made good roots, in the following autumn they may

be separated and planted out where they are to remain. As their branches are weak and slender, they require support; and when planted near trees thrive better than in an open situation.

The third sort may be increased by parting the roots, and planting them out in the spring, a little before the plants begin to shoot, in warm situations where the soil is light, as in strong retentive land the roots are apt to rot. When planted close to a wall exposed to the south or west, their stalks may be fastened against the wall, to prevent their trailing upon the ground; in which situations the plants frequently flower. They should have a little shelter in severe frost in order to preserve their stalks.

They afford ornament and variety as climbers in the shrubberies and other parts.

MENTHA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ* or *Labiatæ*.

The characters are: that the calyx is a one-leaved, tubular perianthium, upright, five-toothed, equal, permanent: the corolla one-petalled: petals upright, tubular, a little longer than the calyx: border four-parted, almost equal; the upper segment wider, emarginate: the stamina have four filaments, awl-shaped, upright, distant, the two nearest longer: anthers roundish: the pistillum is a four-cleft germ: style filiform, upright, longer than the corolla: stigma bifid, spreading: there is no pericarpium: calyx upright, with the seeds in the bottom: the seeds four and small.

The species cultivated are: 1. *M. viridis*, Spear Mint; 2. *M. rotundifolia*, Round-leaved Mint; 3. *M. crispa*, Curled Mint; 4. *M. piperita*, Pepper-Mint; 5. *M. gentilis*, Red Mint; 6. *M. Pulegium*, Pennyroyal; 7. *M. cervina*, Hyssop-leaved Mint, or Upright Pennyroyal.

The first has long, creeping, very spreading roots; the stalks are upright, square, single, green, rising two or three feet in height: leaves spear-shaped, serrated, close-sitting, smooth, very green: the stalks are terminated by purplish flowers, in oblong erect spikes: the stamina longer than the corolla, the latter of which is purplish red. It is a native of Britain, &c.

As it is not so hot to the taste as Peppermint, and having a more agreeable flavour than most of the other sorts, it is generally preferred for culinary and other purposes. The leaves and tops are used in spring salads, and eaten as sauce with lamb, and, when dried, in soups, &c.

There are several varieties: as broad-leaved; narrow-leaved; curled-leaved; variegated-leaved; silver-striped-leaved; gold-striped-leaved.

The second species has the stems from two to three feet in height, erect, hairy or shaggy, the hairs pointing more or less downwards: the leaves are somewhat cordate, rugged, strongly and sharply crenate or rather serrate, the teeth and points of the small upper ones being often very taper: the under side is shaggy not hoary, and all the veins are fringed as it were with close hairs: the spikes are several, terminating erect, sharpish, not very densely whorled: the bractes lanceolate, hairy, sharp and projecting: the flowers reddish: the calycine teeth broad at the base; the stamens always much longer than the corolla. It is a native of several parts of Europe, flowering in August and September. It is found in gardens variegated.

The third has the stems hairy, much branched, about the same height with common Spear Mint: the leaves deeply indented on their edges, waved and curled, light green: the flowers purple, growing in thick interrupted spikes at the top of the stalks: the calyx cut almost to the bottom: the style standing out beyond the corolla. It is a native of Denmark, or Siberia.

The fourth species has smooth purple stalks: the leaves are smaller than those of Spear Mint; they are lanceolate, serrate, very dark green, with purple midrib and veins, and they are a little hairy on their under side: the spikes of flowers are shorter and thicker than those of Spear Mint, and are broken or interrupted at bottom, the lower whorls peduncled, distant, consisting of from nine to twelve: the corolla is of a dark purple colour, and the stamens are longer than the corolla.

In external appearance it corresponds with the first sort, for which it may easily be mistaken; but in that the stem is taller, the leaves have scarcely any petioles, and are narrower in proportion to their length, the spikes are longer and composed of more whorls. It is a native of Britain, flowering in August.

The fifth has several erect stems, growing in tufts, about eighteen inches high, with harsh somewhat hairy angles, more or less reddish in the upper part, branched, leafy: the leaves most crowded towards the upper part, sharply serrate, veiny, punctuated with shining dots, having a few short hairs scattered over them, especially about the margin, and along the nerves on the back: their usual scent is much like that of the first sort, but the smell of Mints is very variable. It is a native of several parts of Europe.

There is a variety with the scent of Basil; Orange scented Mint; Gold striped orange Mint; Yellow orange Mint; and Reddish orange Mint.

The sixth species has a fibrous perennial root: the stems smooth, and putting out roots at every joint: the leaves for the most part entire: the flowers towards the upper part of the branches, just above the leaves at each joint, in whorls: the corolla small, pale purple; upper lip entire: the stamens of the same length with the corolla, but the style somewhat longer. It is a native of many parts of Europe, flowering in August and September.

It varies with a white flower, and with the stems erect, nearly a foot high: the leaves longer and narrower: the whorls of flowers much larger: the stamens longer than the corolla: this is Spanish Pennyroyal, which has almost superseded the other sort; the stems being more erect, it is easier to tie in bunches, and it comes earlier to flower, and has a brighter appearance.

The seventh has also erect stems, nearly two feet high, sending out side branches all their length: the leaves are very narrow, and of a thicker substance than those of common Pennyroyal: the whorls of flowers are rather larger, and the stalks are frequently terminated by them: the scent is not quite so strong as that of the sixth sort. It flowers about the same time, and is a native of the South of France and Italy.

There is a variety with white flowers, growing taller than the common one with purple flowers, which is by some preferred to the sixth sort for medicinal use, and called Hart's Pennyroyal.

Culture in the mint kind.—These plants may all be increased with facility by young offset plants or shoots, or by parting their roots, and planting them out in the spring, or by planting cuttings during any of the summer months in a moist soil. After the cuttings are planted, when the season is dry, they should be often watered until they have taken root; when they require no further care, but to be kept clean from weeds. The best method is to plant them in beds about four feet wide, allowing a path about two feet broad between them, to water, weed, and cut the plants; being set four or five inches or more distant in the rows, as the plants spread much at their roots; on which account the beds should not stand longer than three years before planting them again, as by that time the roots become so closely matted, as to rot and decay each other when they stand longer.

The general culture is that of clearing them

from weeds in spring and summer, cutting down all the remaining stalks annually in autumn; clearing them of all weeds; digging the alleys, and spreading a little of the earth over the beds.

Plantations thus formed will afford several cuttings every summer, when only wanted young for use, for culinary purposes; but when for drying to keep in winter, or green for distilling or medicinal use, the plants should generally be suffered to stand until nearly full grown, and they are just coming into flower; which being then cut down close, the roots send up another crop fit for cutting again in the beginning of autumn, or towards Michaelmas; each general cutting being always made as close to the ground as possible.

Forcing Mint on hot-beds.—When it is much wanted for salads in the winter and early spring seasons, a hot-bed should be made for this purpose, any time after November till the spring, about two feet thick of dung, covering it with garden-frames and glasses, or with mats, on arched sticks, which should then be earthed over with rich mould, six inches thick; when a quantity of the roots should be taken up from a bed and planted pretty close together upon the surface of the bed, moulding them over an inch deep with fine earth, putting on the lights, or other coverings, keeping them close in the nights and in bad weather, but admitting fresh air in mild weather. The plants soon come up, when continue to admit fresh air in fine weather, and give moderate waterings, and they will soon be ready to have their young green tops gathered for use.

When the plants are two or three inches high, they are ready for being cropped, after which they readily break out again, and fresh shoots rise from the bottom; so that the same bed furnishes fresh supplies a long time; two beds, made at different times, being generally sufficient for the whole winter use.

In this way Mint may be obtained young and green from the time that in the natural ground goes off in autumn until it comes in again in the spring season.

It may also be procured by planting some roots thick in large pots, and placing them in a hot-house, as they quickly shoot and furnish plants of young green Mint.

Where this practice is much attended to, small fresh plantations should be made annually in the open ground for the purpose of furnishing a sufficiency of roots, proper for taking up at forcing time, without disturbing those of the principal crops.

Culture in the Pennyroyal kinds.—These may

be increased in the same manner as above, and also by their creeping stems, which should be cut off and planted out in fresh beds, allowing at least a foot distance every way. The young shoots planted in the spring in the same way also take root like the other sorts.

The proper time for this work is in the early autumn, that the plants may be well rooted before winter.

In this way the plants are much stronger and produce larger crops than when planted out in the spring. When the roots remain so close as is generally the case, they are apt to rot in the winter season. They succeed best in a moist strong soil.

Some of the species and varieties may be introduced in the borders and other parts of pleasure-grounds, for ornament and variety.

MESEMBRYANTHEMUM, a genus containing plants of the succulent flowery exotic kinds.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-leaved perianthium, five-cleft, superior, acute, spreading, permanent: the corolla is one-petaled: petals lanceolate-linear, very numerous, in several rows, a little longer than the calyx, slightly united at the claws into one: the stamina have numerous capillary filaments, the length of the calyx: anthers incumbent: the pistillum is an inferior germ, with five blunt angles: styles commonly five, awl-shaped, upright, and then bent back: stigmas simple: the pericarpium is a fleshy capsule, roundish, the navel marked with rays; the cells corresponding with the styles in number: the seeds very many and roundish.

The species cultivated are: 1. *M. crystallinum*, Diamond Fig Marigold, or Ice Plant; 2. *M. pinnatifidum*, Pinnated Fig Marigold; 3. *M. Tripolium*, Plane-leaved Fig Marigold; 4. *M. caducum*, Small-flowered Fig Marigold; 5. *M. pupulosum*, Angular-stalked Fig Marigold; 6. *M. geniculiflorum*, Jointed Fig Marigold; 7. *M. noctiflorum*, Night-flowering Fig Marigold; 8. *M. splendens*, Shining Fig Marigold; 9. *M. umbellatum*, Umbelled Fig Marigold; 10. *M. expansum*, Houseleek-leaved Fig Marigold; 11. *M. culumiforme*, Quill-leaved Fig Marigold; 12. *M. bellidiflorum*, Daisy-flowered Fig Marigold; 13. *M. deltoides*, Delta-leaved Fig Marigold; 14. *M. barbatum*, Bearded Fig Marigold; 15. *M. hispidum*, Bristly Fig Marigold; 16. *M. villosum*, Hairy-stalked Fig Marigold; 17. *M. scabrum*, Rugged Fig Marigold; 18. *M. reptans*, Creeping Fig Mari-

gold; 19. *M. uncinatum*, Hook-leaved Fig Marigold; 20. *M. spinosum*, Thorny Fig Marigold; 21. *M. tuberosum*, Tuberous-rooted Fig Marigold; 22. *M. tenuifolium*, Slender-leaved Fig Marigold; 23. *M. stipulaceum*, Upright-shrubby Fig Marigold; 24. *M. crassifolium*, Thick-leaved Fig Marigold; 25. *M. falcatum*, Sickle-leaved Fig Marigold; 26. *M. glomeratum*, Clustered Fig Marigold; 27. *M. bicolorum*, Two-coloured Fig Marigold; 28. *M. serratum*, Serrate-leaved Fig Marigold; 29. *M. micans*, Glittering Fig Marigold; 30. *M. nericulatum*, Spit-leaved Fig Marigold; 31. *M. glaucum*, Glaucous-leaved Fig Marigold; 32. *M. corniculatum*, Horned Fig Marigold; 33. *M. ringens*, Ringent Fig Marigold; 34. *M. dolabriforme*, Hatchet-leaved Fig Marigold; 35. *M. difforme*, Various-leaved Fig Marigold; 36. *M. albidum*, White Fig Marigold; 37. *M. linguiforme*, Tongue-leaved Fig Marigold; 38. *M. pugioniforme*, Dagger-leaved Fig Marigold; 39. *M. tortuosum*, Twisted-leaved Fig Marigold; 40. *M. emarginatum*, Notch-flowered Fig Marigold; 41. *M. bracteatum*, Bracted Fig Marigold.

There are other species that may be cultivated.

The first is an annual plant, distinguished by its leaves and stalks being closely covered with pellucid pimples full of moisture, which when the sun shines on them reflect the light, and appear like small bubbles of ice, whence it is called the Ice Plant: others name it the Diamond Plant, or Diamond Ficoides. The stem has opposite and alternate cylindrical branches, which, when luxuriant, trail upon the ground, and are from one to two feet long. The first four or six leaves are opposite, each pair crossing the other, very lax and succulent, waved, blunt, attenuated or wedge-shaped at the base, and connate, rather keeled underneath, especially at the base, with a slight corresponding channel along the centre of the upper surface, which is covered with less and duller pimples than any other part of the plant: the margin is regularly edged, with globular papule or pimples, which are less than those on the stems: the upper leaves are alternate, growing less and less, nearly sessile, small: the peduncles extremely short or none, alternate, from the axils of the upper leaves: the segments of the calyx unequal, three of them large and leafy, beset with pilose pimples, and acutely pointed; the two inner much smaller, frequently coloured with a purplish tinge, acute at the points: the petals very narrow, blush-coloured without, whitish within, sometimes entirely white. It is a native of Greece, flowering in July and August.

The second species is an annual root, not much branched, of short duration: the whole plant is sprinkled over with glittering particles, like the Ice-plant, to which it bears some affinity in its duration: the stems are branching, of a bright red colour, trailing: the leaves yellowish-green, opposite, attenuated at the base: the flowers small, axillary, solitary, on longish peduncles, yellow: the calycine segments unequal, three being short, two longer and broader: the petals numerous, scarcely equal to the longest segments of the calyx, linear, expanding in the afternoon: the filaments numerous, yellow: the anthers yellow: the germ roundish: capsule obtuse-angled, obtruncate: the seeds numerous, small, roundish, and brown. Introduced from the Cape, flowering in July and August.

The third species has a biennial root: the stems are prostrate, smooth, finally terminating in flowers: the lower leaves many, almost as long as the stems, resembling those of *Aster Tripolium*, but thicker and more succulent: among these spring three or four stems, sometimes more round, and having two or three joints, at each of which are two smaller leaves at the lower, and three or four at the upper joints: the surface in all smooth and even, and very minute white teeth about the edge, more perceptible in the smaller leaves, and the lower part of the others: the flowers are usually solitary, silvery white, opening in the middle of the day, and of short duration. It is a native of the Cape, flowering from June to September.

The fourth is a biennial plant. A native of the Cape, flowering in July and August.

The fifth species has a biennial root: the stem is short, nearly the thickness of the little finger: the branches are opposite, spreading very much, obscurely angular, or round, herbaceous, green, the lower ones procumbent, and a foot and half long: the leaves thick, narrowing into a short petiole, subsessile, entire, flat, somewhat waved, opposite on the branches, at the flowers single; that is, the flowers come out singly on a peduncle opposite to a leaf; these, the stems, peduncles, calyxes, and germs, are covered with very minute shining dots, which when examined with a magnifier appear to be clear drops like ice: the flowers have no scent, and are open from three to six in the afternoon. It is a native of the Cape, flowering from April to October.

In the sixth the plant whilst young is herbaceous, but becoming shrubby by age: the trunk is then woody, a finger or more in thickness, covered with a brownish ash-coloured bark: the branches are decumbent, divaricating whilst

young, cylindric, tender, covered with minute pimples, dark green, thick, fleshy, the bark when old becoming somewhat woody, and assuming various flexuose contorted directions: all the branches are nearly of the same thickness; but the upper ones are shorter, and more woody next the stem: the leaves are mostly opposite, but not always so, especially on the flowering branches, smooth, cylindric, convex beneath, slightly channelled above, minutely pimpled: the flowers are small. It is a native of the Cape, flowering from June to August.

In the seventh, the trunk, which attains the thickness of the little finger, is smooth and even, covered with a bay-coloured bark, and has frequent joints where branches have fallen: the branches are opposite, spreading irregularly, and decumbent from the weight of the leaves: the leaves pale green and slightly glaucous, obtusely triangular, smooth and even, opaque, minutely and thickly dotted so as to make a very fine net: the lower ones longer; their upper ones, whence the peduncles arise, shorter and thicker: the calyx four-cleft: the petals narrow, the inner ones gradually shorter, inwardly white, outwardly purple: the flowers are closed during the day, open in the evening, and continue so during the night, at which time they are very sweet. It is a native of the Cape, flowering from June to August.

There is a variety in which the flowers are somewhat larger, and of a very pale yellow on the outside.

The eighth species has woody stems, a foot and more in length, with many short branches and clustered leaves, with which they are so loaded that they cannot support themselves: the leaves are short, bluntly three-sided, thick, smooth, and shining, pale green, scarcely if at all glaucous, with a few thick green dots: the flowers solitary, at the ends of the branchlets, on very short peduncles, large, whitish or very pale yellow within, reddish on the outside and at the tips: the petals very narrow, the inner ones gradually smaller: they appear in July and August, and open before and after noon when the sun shines, opening and closing several times, and finally closing about the fruit, which is ovate, with five lines or angles, five-celled. It is a native of the Cape.

The ninth has woody stems, forming a regularly branched handsome shrub, standing without support, with a stout stem, from two to three feet high and even more: the branches many, spreading every way, having four lines running along them, which give them the appearance of being quadrangular: the leaves are subtri-

quetrous, wrinkled, bending this way and that, somewhat resembling bulls' horns, glaucous, except the younger ones, which are green and less wrinkled; when held up to the light they appear to have innumerable pores: from one axil of each pair of leaves, sometimes from both, one pair of leaves usually springs, which becomes a shoot, with several pairs of leaves on it: the flowers terminating, white, opening when the sun shines, from seven or eight in the morning to two or three in the afternoon, and smelling like those of May- or White-thorn. It is a native of the Cape, flowering from June to September.

The tenth has the stems and branches irregular and distorted, as in the thirty-ninth sort, from which, however, it differs in being somewhat higher and more branched; the branches interwoven, less woody, but softer and more fleshy, with the bark smoother and of a paler yellow; the leaves greener, something wider and thinner, with the ridge on the outer and the groove on the inner part more conspicuous, though less concave; the dots rather oblong than round, shining like silver in the sunshine; they are not produced in bundles, as in that sort, but more loosely, and decussated: the flowers are somewhat larger and paler: the petals rather wider, becoming yellowish with age. It is a native of the Cape, flowering in July and August.

In the eleventh the leaves are numerous, either upright or bending upwards, rigid, thick, and fleshy, about a finger's length, appearing to be round, but slightly flattened on the inside, especially near the base; they are deep green and glaucous, thickly set with small green dots and some transverse lines, pointed at the end; the point purple or green: the flowers solitary, on a short scape from the centre of the plant, large: the calycine segments are unequal: the petals very narrow, white, shining like silver in the sun, void of scent, opening about noon in July, August, and September. It is a native of the Cape.

The twelfth species has the leaves clustered, decussated, from an inch to two inches in length, deeply glaucous, flat above, but below produced into a sharpish back, towards the end, both above and below, or on all the sides armed with stiffish sharp toothlets; they are smooth, and do not appear to be dotted unless they are held up to the light, but they have a few transverse wrinkles: the peduncles are from an inch to an inch and half and two inches in height, tender, round, usually leafless, but sometimes having a pair of leaves: the flowers are solitary, terminating, the form and size of a Daisy,

whitish with a tinge of purple, and streaked with a purple line along the middle of each petal both within and without; they spread out regularly in two or three rows, and are sometimes entire, sometimes cut a little at the end, opening about noon. It is a native of the Cape, flowering from June to August.

The thirteenth has the peduncles one-flowered, two-leaved: the corollas pale purple, sweet-smelling, not longer than the calyx: the stamens white, upright, and forming a cone: the anthers are yellow: the flowers open in the morning as soon as the sun shines strongly upon them. It is a native of the Cape.

There are different varieties; as the Great Delta-leaved, the Small Delta-leaved Marigold.

In the fourteenth species, the leaflets of the calyx being bearded at the tip, as well as the leaves of the plant, show the origin of the perianthium. The least interior petals, which surround the stamens, are white. It is a native of the Cape.

There are several varieties; as the shrubby, bearded, the small dwarf-bearded, and the great dwarf-bearded.

The fifteenth has the peduncle very rugged downwards, rather to the sight than the touch: the calyx is awnless: the flower is sweet-smelling, very like that of the preceding, from which perhaps it originally sprung, losing the beard of the leaves, and having it scattered over the stem. It is a native of the Cape, flowering the greater part of the year.

There are different varieties; as the purple flowered, the pale flowered, and the striped flowered.

The sixteenth species has the leaves linear, semicylindric, channelled-flat, opaque, with villose hairs scattered over them, especially at the base: the stem is pubescent, with villose hairs scarcely standing out: the plant is hairy, prostrate, finally shrubby: the branches in distant pairs, crossing each other, axillary, cylindrical, covered with the permanent, cylindrical, hairy sheaths of the connate leaves, whose hairs are not very thick set, but short, white, and rather pressed to the stem; some of them expanding, but pointed upwards: the leaves are less succulent than those of any other species, connate, but appearing distinct, unless attentively examined; they are linear, scarcely pimpled, or, if so, the pimples are extremely minute, shining in the sun, and of a dark green colour; they are channelled above, with a convex or rounded keel, slightly attenuated both ways, rather dilating again at the very base, and embracing the stem, where they are quite destitute of succulency, and slightly membranaceous at

the edges, with a white midrib: the membrane at the base is ciliate; the rest of the leaf nearly smooth, or having distant small white hairs scattered over both sides: the flowers are solitary, terminating, rarely seen, opening to a very warm sun only in the forenoon. It is a native of the Cape.

The seventeenth species has woody stems, at bottom bay: the branches yellowish-brown, procumbent, round at bottom, but somewhat angular above: the peduncles, however, are round: the leaves are acutely triquetrous, glaucous, somewhat shorter and thicker, rougher and more rigid, with frequent tubercles larger and whiter, especially on the back, than in the fortieth sort: the flowers are solitary, few (two or three), violet purple and shining, but becoming paler, opening two or three times, before and after noon: the petals mostly of the same size, entire or slightly cloven at the end, firmly connected at the base; they end suddenly in filaments, which are not scattered, but collected into a head about the stamens, like a crown. It is a native of the Cape.

The eighteenth has the leaves between papulose and tubercled; much rougher, more glaucous, and more acutely pointed, than in any other reptant species: the branches are angular, and finally somewhat woody: in its triquetrous leaves and reptant stems it is allied to the twenty-fourth sort. In the open air it will extend the branches above a foot and a half every way, and they are fixed firmly to the ground at every joint by strong fibres. It is a native of the Cape, flowering in July and August.

The nineteenth species has the stems slender and round: the branches rather frequent, reclining, with much smaller and more recurved leaves: having only one short spinule at the back: they end in a spinule short and whitish: the stems and branches, though rigid, are procumbent: the leaves, and internodes, which are elongations of the leaves, investing the stems, are dotted with small dots of a fuller glaucous green colour, and not so white: the bark of the stem rather of a yellow and brown dusky whitish colour: the internodes are thickened above, and narrower beneath: the flowers are axillary, on leafy peduncles. It is a native of the Cape, flowering from June to August.

There are different varieties.

The twentieth is an upright thorny shrub, from two to three feet high, much branched: the branches opposite, axillary, ascending, roundish-compressed, with a smooth cinereous bark, throwing out in various places branching spines: the leaves are in pairs, at an interval of an inch or an inch and half, glaucous, with fre-

quent green dots, pellucid when held up to the light; all the angles blunt, slightly swelled at the inner bases, very firm to the touch, terminating in a very small white cartilaginous point, or harmless bristle: the upper leaves are much shorter: the spines appear as if terminating, but soon cease to be so, from the protrusion of young shoots; they are branched, nearly horizontal, divaricating and trichotomous, each from half an inch to an inch in length, awl-shaped, very sharp, resembling those of the common Hawthorn, but not so strong or pungent, covered with a grayish bark, and beset with a pair of distinct, opposite, chiefly barren leaves, like those of the branches, but only a-third of the size: the flowers small, pale violet purple, on slender, leafless, green peduncles. It is a native of the Cape.

The twenty-first species forms a low, much branched, spreading shrub; and, when old, has a very large tuberous root, sometimes as big as a man's head, partly protruded above the surface: the stem woody, very thick at bottom, covered with a bay-coloured bark: the branches bending, entwined: the leaves short, bluntly triquetrous, with the back convex, the inner or upper surface somewhat swelling, subglaucous, with silver dots, so small as not to be visible except when the sun shines: the flowers are at the ends of the branches, on slender cinereous, or reddish peduncles; are small, of a pale red or vinous colour: petals not numerous, broadish, blunt, equal in size: the stamens collected into a bottle in the middle. It flowers about noon, and is a native of the Cape, flowering from June to September.

It is observed, that in old plants the extreme branches sometimes become thorny; which thorns are the peduncles of the preceding year; thorns also sometimes come out from the forkings of the branches, instead of flowers.

The twenty-second has the stems woody, procumbent, slender, round, with a yellowish bark: the branches from each of the upper axils: the leaves on the inner surface flat, on the outer convex, bright green, inclining to gray, from their slenderness often hanging down, appearing dotted when held up to the light: the flowers at the ends of the branches solitary, on long slender peduncles; they are large, especially on young plants, pale scarlet, shining, and appearing powdered with gold dust in full sunshine: the petals very numerous; the inner ones gradually smaller, entire or cuspidate at the end, sometimes slightly bifid, cohering at bottom: the flowers abundant, and opening several days successively about noon, especially in June.

According to Mr. Haworth, in many stages of

its growth it is very liable to be taken for the twenty-seventh sort, and that it frequently emits roots from the joints of the stems, and thereby becomes creeping. It is a native of the Cape, flowering from June to September.

The twenty-third species is an upright plant, woody, firm, growing to a larger size than most of the species: the flowering-stem is rigid and somewhat gray: the branches axillary, opposite, from erect spreading, crossing each other in pairs, and beset thickly with young leaves on their first outset, whitish or glaucous, but finally brownish, gradually shorter upwards, forming a beautiful pyramidal glaucous plant, well covered with fine leaves; these when full grown are from two to three inches long, slightly curved upwards or falcate, very glaucous, crossing each other in pairs; very much compressed at the sides, having pellucid dots scattered over them, flattish above and mucronate: the flowers terminating in a sort of corymb, large, showy, purple. It is a native of the Cape.

The twenty-fourth has the stems a palm or long span in length, creeping, when young herbaceous and soft, three-sided, green, frequently purple next the sun; when old, more round, still not woody but soft, tough, and fungous, covered with a cinereous bark: the leaves are usually in the same plane, or not decussated, divaricating, or not approximating like many of the other species, thick, succulent, bluntly three-sided, smooth and somewhat shining, green: the flowers on short peduncles, sometimes naked, but more frequently with a pair of leaves on them; solitary, small, violet purple: the petals not very numerous: the stamens many, short, not very much scattered, but not collected into a head or upright. It creeps so much that it seldom flowers, and when it does the flowers do not continue long. It is a native of the Cape.

The twenty-fifth species is a very low, bushy, divaricating almost decumbent shrub, rarely more than six or eight inches high: the branches are opposite, slightly angular, axillary, divaricating, and densely crowded: the leaves very minute and much crowded, glaucous, having smooth pellucid dots, attenuated at the base, very gibbous on the keel, sharply incurved or falcate, near a quarter of an inch long, and ending in an acute, white, just perceptible, bristly point in the direction of the leaves: the flowers are purple, large, solitary, opening in the morning, on short terminating peduncles: the leaves are sometimes so much incurved as to form half a circle, and are remarkably small. It is a native of the Cape.

The twenty-sixth is a small, very bushy, rather glaucous shrub, from six inches to a foot or more in height: the branches almost upright, or often diffuse and panicled, round whilst young, slightly angular when old, covered with a brown bark, for the most part opposite and crowded: the leaves are also opposite and crowded, rather glaucous, having pellucid spots, usually distinct, but sometimes confluent; they are subtrigonal with blunt angles, awl-shaped, attenuated at the base, slightly incurved, sometimes almost sabre-shaped, from three quarters of an inch to an inch and half in length: the flowers are very numerous, reddish purple, like those of the thirteenth sort but more handsome, expanding in the fore part of the day in such profusion as often to cover the surface of the plant: petals linear, numerous. It is a native of the Cape, and flowers from June to August.

It is very variable, assuming different appearances, according to its treatment, and the different stages of its growth: its very numerous beautiful purple flowers, covering the whole plant, and produced every season, make it a valuable species.

The twenty-seventh species grows up into a long, slender, and not much branched shrub, from a foot to two feet high and more: the leaves are slender, oblong, bluntly three-sided, green, not glaucous, rugged to the sight, not the touch, with frequent green tubercles, which when held to the light appear whitish and pellucid: similar tubercles are observed in the lower part of the fruit: the flowers terminating, middle-sized, golden within, red on the outside. It is a native of the Cape, flowering from May to September.

The twenty-eighth is an elegant species, three quarters of a yard in height, with woody stems, not so thick as the little finger, and not much branched, procumbent, covered with an ash-coloured bark: the flowers are on the upper branches, solitary, terminating, large, of an elegant yellow colour, composed of two or three rows of petals, which are blunt, entire, and sometimes jagged, the outer longer and flat, the inner suddenly shorter, more erect, concave, and at their base a circle of saffron-coloured anthers on very short filaments; the bottom of the flower being void, smooth, and even, hollowed out like a dish: they open several times from eight in the morning to three or four in the afternoon if the sun shines, and have a little smell. It is a native of the Cape, flowering in June.

The twenty-ninth species has stems from a foot to two feet in height, procumbent, woody, and much branched: the branches are round,

slender: the leaves in pairs, at an inch or an inch and half distance, an inch in length, thickish, on an old plant narrower and shorter, on a young one longer and thicker, not quite round, but obtusely triangular, with the angles, however, so blunt that they are rather cylindric than three-sided; are overspread with glittering spangles of a greenish yellow colour: the stems and lower branches are bay-coloured and smooth; the upper ones reddish brown, rough to the touch, with many whitish dots, which were originally spangles: the peduncles and calyxes shine with spangles like those of the leaves, but thicker: the flowers are terminating, on peduncles from an inch to an inch and half in length; they are large, concave, with the margin bent back, composed of numerous petals, cohering to the base, gradually smaller, and filamentose in the middle, of a dirty red colour on the outside, but within very dark orange-coloured, deepest at the edge; the narrow middle petals next the white filaments being very dark, by which it is easily distinguished from the other sorts. It is a native of the Cape, flowering from May to August.

It varies with paler smaller flowers.

The thirtieth has the stem woody, from a foot to two feet in height, covered with an ash-coloured bark, deformed by age with irregular wide fissures, knotted and jointed, divided and subdivided into several opposite branches: the leaves so bluntly triangular as to appear to be round, an inch and half or two inches in length, the size of a swan's quill, with dense bundles of other leaves coming out from the axils, glaucous, smooth, appearing pellucid when held up to the light, purple at the end, as are also the branches: the branches and leaves are at short intervals; and, affecting an upright position, this plant has the appearance of a shrub, though probably it would be weighed down by the number and size of the leaves and branches: the flowers are in a sort of umbel at the ends of the branches, from the axils of the leaves, small, pale yellow, and sweet smelling. It is a native of the Cape, flowering in May and June.

It varies with shorter and more manifestly three-sided leaves and fewer flowers.

The thirty-first species has the stems half a yard high and more, woody, with frequent joints, ash-coloured, with fissures at bottom, bay-coloured and more smooth above: the lower and middle branches are twisted, the upper ones are straight and little divided: the peduncles an inch and half or two inches long: the flowers large, pale yellow, or sulphur-coloured on both sides, sometimes slightly tinged with

red on the outside: the petals long, narrow, cuspid, with smaller ones interspersed among the others: they remain expanded only a few hours, and contract about noon: but open several times, and have a succession during the summer months. According to Mr. Haworth, it is a strong upright shrub, the flowers being produced only by old plants, and by them but sparingly. It is a native of the Cape, flowering in June and July.

The thirty-second species has the stems longer, less pressed to the ground than the variety below: all the leaves at the joints are very long, more thick and glaucous: the peduncles not naked, but surrounded by a pair of short leaves: the flower of a deeper yellow colour, with a red line along the back: the stamens numerous, neither collected nor much scattered: yellowish, and whitish anthers: the styles very many, (according to Linnæus, ten) reddish, slender, villose: the capsules round, depressed, fifteen- or sixteen-celled, with a crown on the top of the same number of rays: the leaves which spring from the axils of the larger ones are less frequent and less bent in; but these younger leaves have the angles more acute, and are more glaucous than the longer leaves at the joints, which the nearer they are to the root, the paler and more flaccid they seem to be; the rest are more rigid and succulent, not wrinkled, and scarcely dotted, but the lower ones have transverse lines on their flat sides, are somewhat wrinkled, and much dotted underneath: the flowers are flat, and continue some days expanding about noon.

There is a variety which throws out many procumbent branches, tough at the lower part, but not properly woody, herbaceous at the upper part, about three inches in length, round or slightly angular, jointed at short intervals, with bluntly triangular leaves, from which other leaves spring in bundles, of the same form, but shorter; the root-leaves and those at the base of the branches remarkably long: the leaves bend like the horns of kine, whence the trivial name; they are somewhat glaucous, become soft and flaccid, and then appear marked with many lines and dots: the peduncles six inches in length, or nearly so, and naked: the flowers the size and almost the form of those of Dandelion, but paler, or sulphur-coloured, composed of numerous petals, of which the inner ones are shorter, with a red purple streak running along the middle on the outside, the same tinge appearing at the extremity and base of the petals. It is a native of the Cape.

The thirty-third is stemless whilst young, but acquires by age considerable trailing woody

stems: the leaves are connate, spreading, glaucous, opaque, not marked with lucid dots, somewhat sabre-shaped, or attenuate from the middle downwards to the base, where they are semi-cylindric; thickening towards the points, where they are triquetrous, with a sharp keel, and sides edged with irregular harmless teeth; terminating in a similar tooth, placed on the inner side: the flowers are large, showy, yellow, opening in the afternoon, and closing in the evening. It is a native of the Cape, flowering from May to July.

There is a variety which is entirely sessile, of a whitish glaucous colour, with the leaves paler at the base, with frequent round whitish dots, especially towards the end; they are shorter than those of the preceding, more resupine, less triquetrous, but with a rounder back, and more frequent, longer, incurved prickles, terminated by slender harmless spinules, which are sometimes white, sometimes reddish: the leaves have a white line at the end, which is continued towards the back: there is first a flower in the middle, and afterwards several come out successively at the sides, all sessile. It is called *Cat-Chap* Marigold.

Mr. Haworth has two other varieties; the *Tiger-Chap* Fig-Marigold, which is stemless in all the stages of its growth; being more succulent and gross than the following: the leaves are rather shorter, beset with much longer hairs on the sides, and having numerous whitish spots: the flowers are sessile, yellow, and large;—and the *Mouse-Chap* Fig-Marigold, in which the branches in very old plants are some inches long, and numerous, forming a fine tufted plant: the leaves connate, when young resembling the gaping jaws of a small quadruped, the denticulations on each side resembling teeth; when old, the leaves spread out, and are even recurved; all very glaucous, only about a fourth part of the size of the others, and often roughly dotted: the dots lucid, elevated into small tubercles: the flowers small and of a yellow colour.

The thirty-fourth species at first is a low plant, but it becomes larger and stronger; it does not however rise above a long span in height in six years: the stem is then thick and woody, and several reclining twisted branches spring from it alternately, covered with a dusky reddish bark, smooth, but transversely chinked and irregular; at the end of which come out several leaves disposed crosswise; they are thickish, bluntly flat at top, with a roundish back below, more compressed towards the end, and terminating in a process at the lower part; their colour is deep glaucous green, except the old ones, which are

yellowish, and when dry, brown: the whole covered with frequent green dots, pellucid when held up to the light, protuberant towards the end of the leaves, and rendering them somewhat rugged there: the peduncles an inch and half or two inches long, bracteate: the flowers opening in the afternoon, (about four o'clock) coming out frequently several from the same peduncle, but much smaller, and of a paler yellow colour than in the *Dog-Chap* Fig-Marigold. It is a native of the Cape, flowering from May to July.

The thirty-fifth is a middle sort, between the caulescent and sessile ones, properly belonging to those which are procumbent, and acquiring by age woody branches, short and pressed to the ground, from which, at short distances, and on short slender woody petioles, of a dusky pale brown colour, spring thick leaves in clusters, bright green and shining, triquetrous inclining to round, wider towards the base, and somewhat flattened on the upper part, the lower part rounded, towards the middle, where the flat part ends; some short processes come out on both sides, sometimes on one side only, and sometimes they are wholly wanting; hence towards the point the leaves take a different form, and have the sides from round flattened; they are not however broad and flat, but triquetrous-cylindric. It is a circumstance peculiar to these leaves, that one side of each is much shorter than the other, and hence they are called difform: they have frequent largish dots on them, which appear pale and pellucid, but sometimes dusky green; they are generally protuberant, and thereby render the surface irregular: the peduncles thick, herbaceous, bluntly triquetrous, from half an inch to an inch and half in length: the flowers rather large, like those of the Tongue-leaved sort, but somewhat smaller, and of a deeper yellow, internally of a shining golden colour, externally of a reddish saffron-colour, and when far advanced, saffron-coloured within. It is a native of the Cape.

The thirty-sixth species has the lower leaves oblique, the others more upright, not at all or but little bent in or sickle-shaped; they are long, thick, rigid, smooth and shining, flat within or on the top, underneath produced into a sharpish back, which becomes blunter and rounder in the lower part; all the sides are nearly equal: they are of a white elegantly glaucous colour, except that they are yellowish near the base with slender transverse lines: the flowers are large, yellow, on a long thick peduncle.

The thirty-seventh has the leaves in it as well as in all the varieties not decussated, but lying in the same oblique plane. It is a native of the Cape.

There are several varieties.

In the first, the leaves are wide and compressed about the edge: the flowers somewhat large, with blunt petals, scattered and not numerous, with scarcely any peduncle: one plant has several heads, from each of which are produced clusters of leaves in pairs, disposed like those of the Tongue Aloes, but with the edges not horizontal but oblique: there are generally three or four pairs of these leaves; they are broad and thick, flat above, pillowed below, bright green, smooth and shining, sometimes blunt, sometimes a little pointed, generally in the shape of a shoemaker's knife: the younger leaves in this and the other varieties are folded together and obliquely inserted into each other: the flowers come out successively in August and September from the axils, beginning with the lowest, they are subsessile, large, yellow, somewhat paler than in the following variety, shining in the sun: petals somewhat blunter, entire, or sometimes cut here and there.

The Broad Tongue-leaved variety has thick leaves, flat above, convex beneath, with the margins thicker and less upright than in the preceding, smooth and shining, pale green, especially toward the base, when held up to the light appearing to be composed of innumerable vesicles: three or four pairs of these leaves lie in the same inclined plane; these are sometimes flatter and blunt at the end, sometimes very much cut at the edge: from the lower pair first, and then from the next, a short peduncle arises, obtusely triquetrous, bearing a large flower of a shining golden colour, with many stamens, having oblong golden anthers.

The Narrow Tongue-leaved variety is very like the preceding, but the petals have a slight tinge of red on the outside: the older leaves are more reflex; the younger ones, which are closer and more luxuriant, are somewhat twisted in and excavated, and are of a fuller green colour: the fruit is smaller and softer, not elevated, but rather depressed, roundish, and commonly streaked with eleven angles; it is generally eleven-celled; the cells being the same in number as there are horns of the style, which are depressed at the bottom of the flower under the stamens, and are curled and wrinkled: the petals in two or three rows, almost of the same length, of a shining yellow colour. It flowers in August and September.

There is another variety, which is distinguished from the others by the leaves being longer and more erect: the peduncles of the flowers longer: the capsules less globular, commonly divided into nine cells: the calycine segments four, three longer and narrower, one shorter and broader,

with a membranaceous margin: the flowers have a double or triple row of petals, shining in the sun with the splendour of gold: the stamens numerous, with oblong saffron-coloured anthers.

The thirty-eighth species grows up into a stem an inch and more in thickness, and two or three feet in height, standing upright with little or no assistance, with a crown of clustered leaves a long span in length at the top, and branches a foot long and more at the base, which hang down with the weight of a multitude of leaves: very old plants grow a yard in height, with long incurved twisted branches: the stems and lower branches are of a dusky yellowish colour, but the upper flowering branches green; on the lower part of these the leaves are alternate, but on the upper part, where the flowers come out, clustered and somewhat shorter, in pairs at short intervals, triquetrous, with equal angles, slightly grooved on the sides, especially on the inner side; but the alternate ones have the inner side rather flat: they are not dotted, but are of a deep green, almost glaucous, like the leaves of Pinks, at the angles towards the base tinged slightly with purple: the peduncles from the axils of the upper leaves a span in length, thick, at first hanging down, but afterwards erect: the flowers large, expanding when the sun shines, straw-coloured above, tinged with red underneath, composed of numerous slender cuspid petals, gradually smaller, and the inner ones filamentose. The flowers are open from eight or nine in the morning to four or five in the afternoon. It is a native of the Cape, flowering from May to August.

The thirty-ninth has the stem short, thickish: the branches unequal, spreading irregularly on the ground, covered with a smooth bark of a dusky yellowish colour, with other smaller simple ones springing from them, which are also irregular and twisted: the leaves are pointed, slightly excavated within in the middle, the outer part produced and swelling, of a yellowish green colour, with frequent minute dots regularly in lines: the flowers are somewhat small, but white: the petals narrow, peduncles short, so that the flowers frequently scarcely emerge from the bundles of leaves: they are filamentose, and where white shine with a silvery brightness in the sun; but in the middle, next the stamens, are slightly tinged with yellow, and shine less: they are without scent, open two or three times, and in the day time only. It is a native of the Cape, flowering from June to October.

The fortieth has the stem shrubby, but procumbent; even when tied up its irregular twisted branches will hang down: they are round towards

the top, and of a yellowish bay colour, but quadrangular at the bottom: the leaves tender, mucronate, curved inwards, in bundles, acutely triangular, deep green and glaucous, having small dots and tubercles: the flowers are several, terminating, middle-sized, with scarcely any odour, on slender oblong peduncles: the calycine segments sometimes hooked, sometimes not: the petals very many, lying one over the other; the outer larger, bifid or trifid at the end; the inner ones gradually smaller, entire, but not filamentose: they are of a most vivid violet purple colour, but the flowers expand only about noon, when the sun is very hot: the flowers continue long, and open several times if the sun shines hot. It is a native of the Cape, flowering from June to August.

The forty-first species is from a foot and half to two feet in height: the stem not very shrubby, nor very thick: the branches woody, the thickness of a straw, procumbent, round, covered with an ash-coloured bark: the upper shoots of a yellowish bay colour, becoming pale herbaceous; they are gradually more slender, slightly compressed, and winged on each side with a process from the back of the leaves: the leaves difform; those which are fastened to the peduncles (bractes) short and thick, the others longer and not so thick, with other smaller leaves from the axils; all uncinat, subglaucous, rugged with frequent tubercles of the same colour, which when held up to the light appear to be so many porous dots: the flowers are on peduncles from an inch to two inches in length, alternately axillary, small, pale purple, petals twisted about, narrower towards the base, broader towards the end, entire, in a single row, smelling like those of the Hawthorn, open both day and night, for a long time, and in great abundance, there being a succession of them from July to October. It is native of the Cape.

Culture.—The annual and biennial sorts may be increased by sowing the seeds in the early spring months, on a fresh hot-bed, covered with sandy earth, or in pots of fine sandy mould.

When the plants have attained a few inches in growth, they should be planted on fresh hot-beds, or in pots plunged in them, to bring them forward; and when they have taken root, they should have very little water: when large enough, each should be planted in a small pot, filled with light fresh earth, but not rich, plunging them into a hot-bed of tan, shading them in the heat of the day until they have taken new root, when they should have plenty of fresh air. About the beginning of summer some of the plants may be injured

VOL. II.

to the open air, and afterwards be turned out of the pots, and planted with balls of earth about them in a warm border, where they often thrive and spread, but are not very productive of flowers in this way. Some must also be continued in pots, and removed to the shelves of the stove, where they flower more plentifully.

The culture which they afterwards require, is, for those in the pots to have frequent slight waterings in dry weather, and the others kept clean, and their branches permitted to spread upon the surface of the ground.

All the perennial sorts may be easily increased by cuttings planted during the summer months. Those having shrubby stalks and branches, readily take root when planted out in beds or in pots of light sandy soil, covered with mats or glasses: in the latter case, being shaded when the sun is warm. The cuttings of these sorts need not be cut from the plant more than five or six days before they are planted, during which time they should be laid in a dry room, not too much exposed to the sun, that the parts which were separated from the old plants may heal over and dry, otherwise they are apt to rot. They may then be planted at about three inches distance from each other, the earth being pressed very close to them, and none of their leaves buried in the ground, as from their abounding with moisture, when they are covered with the earth it is apt to cause them to rot, which often destroys the cuttings. When they are taken from the old plants, they should therefore be divested of their lower leaves, so as to allow a naked stalk of sufficient length for being planted in the earth.

Those in pots may be plunged in a hot-bed, or in a warm border, due shade and shelter being given, and slight waterings in dry weather. When they have stricken good roots, they should be removed with balls of earth into other separate small pots of light sandy mould, being placed in a shady situation, a very slight watering being given to settle the earth about them. After they become well rooted, they may be removed, so as to have more sun; when they may be kept till autumn, being watered very slightly twice a week in summer and once afterwards, care being taken to prevent their roots shooting through the pots, by shifting them two or three times in the summer, to pare them off.

In the autumn and winter they should be protected in the green-house.

The cuttings of the more succulent sorts should be left to heal over a much longer time, being a little freed from leaves, and covered with glasses to prevent the wet. They should have less water, and be removed less fre-

quently. They succeed well in an airy glass case during the winter, when screened from the frosts.

Such sorts as do not afford cuttings, may also be increased by planting and managing the bottom side-heads or off-sets in the above manner. They may likewise be increased by seeds or cuttings readily in the stove.

The only culture necessary afterwards is, only to give water frequently in small quantities in summer, and very sparingly in winter, shifting the plants occasionally into larger pots.

These are plants which afford a fine variety in green-house collections, and among other potted plants of similar growths.

MESPILUS, a genus containing plants of the deciduous tree, flowering shrubby, and evergreen kinds.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Pomaceae*.

The characters are : that the calyx is a one-leaved perianthium, concave-spreading, five-cleft, permanent; the corolla has five roundish concave petals inserted into the calyx : the stamina have twenty awl-shaped filaments, inserted into the calyx : anthers simple ; the pistillum is an inferior germ : styles five, simple, erect : stigmas headed : the pericarpium is a globular berry, umbilicated, closed by the converging calyx, but almost perforated by the navel : the seeds five, bony, gibbous.

The species cultivated are : 1. *M. Germanica*, Dutch or Common Medlar ; 2. *M. arbutifolia*, Arbutus-leaved Mespilus ; 3. *M. Amelanchier*, Alpine Mespilus ; 4. *M. Chamae-Mespilus*, Bastard Quince, or Mespilus ; 5. *M. Canadensis*, Snowy Mespilus ; 6. *M. cotoneaster*, Dwarf Mespilus ; 7. *M. tomentosa*, Quince-leaved Mespilus ; 8. *M. pyracantha*, Evergreen Thorn or Mespilus.

The first is a small or middle-sized branching tree : the branches woolly, armed in a wild state with stiff spines, covered with an ash-coloured bark : the leaves oval-lanceolate, serrate towards the point, somewhat woolly, on very short channelled petioles ; the bractes linear, as long as the corolla : the calyxes terminating, fleshy, woolly within ; teeth longer than the corolla : the petals white, blunt, entire, with a very short claw : the stamens unequal, thirty or more, with cloven anthers : the fruit an inferior turbinate berry, umbilicated at top with a wide depressed area, and crowned with the five linear calycine leaflets, fleshy, reddish brown ; pulp thick mixed with callose granules, containing five gibbous, wrinkled, one-celled stones, in each of which are two seeds.

It is observed that the wild tree differs from the cultivated one in having more slender, strigose, thorny branches, and much smaller leaves, flowers, and fruits. Pallas found all the parts very small, in his specimens from Persia, with narrower leaves, serrulate frequently almost to the base. In those from Caucasus the leaves were somewhat larger, and sometimes quite entire : and according to Gmelin, in the Persian Medlar, the leaves are red when they burst from the buds : the spines only three or four lines in length, stout, very sharp, spreading : the styles four or five : the fruit much smaller than in the garden sort. It is a native of the South of Europe, flowering in June and July.

There are two varieties, the narrow-leaved and the broad-leaved ; the first growing to a large tree, rising with a straighter stem, and the branches growing more upright than those of the Dutch Medlar : the leaves are narrower and not serrate : the flowers smaller ; and the fruit shaped like a pear. It is a native of Sicily.

The latter never rises with an upright trunk, but sends out crooked deformed branches at a small height from the ground : the leaves are very large, entire, and downy on their under side : the flowers very large, as also the fruit, which is rounder, and approaches nearer to the shape of an apple : this, bearing the largest fruit, is now generally cultivated ; but there is one with smaller fruit, called the Nottingham Medlar, of a much quicker and more poignant taste. There are also other varieties in the fruit, which are now little attended to.

The second species seldom rises more than five or six feet high, where it grows naturally ; and three or four feet is the greatest height it attains in this climate : the branches are few, slender, upright : the leaves alternate, pale green above, ash-coloured underneath : the flowers produced in small bunches, on long peduncles ; at the sides and extremities of the branches : the petals dull white, with several brown spots on their upper side : the fruit small, roundish, a little compressed, purple when ripe. It flowers in May, and the fruit ripens in October. It is a native of Virginia.

It varies with red, with black, and with white fruit.

The third rises with many slender stems three or four feet high, putting out small side branches covered with a dark purple bark : the leaves are three quarters of an inch long, and half an inch broad, slightly serrate : the small side branches, which sustain the flowers, are very hairy and woolly, as are also the footstalks and under side of the leaves, but their upper

sides are smooth and green: the flowers come out in bunches at the end of the shoots, are large and white: the petals are long and narrow, and the stamens about ten in number: the fruit small and sweet, black when ripe. According to Linnæus, while young the branches, petioles, peduncles and under surface of the leaves are tomentose; but when so far advanced as to bear fruit, it puts off the pubescence and becomes smooth. It is a native of the South of Europe.

The fourth species has a smooth stalk, about four or five feet high, sending out slender branches covered with a purplish bark: the leaves are about two inches long, and one inch and a half broad, yellowish green on both sides, on long slender foot-stalks: the flowers axillary, four or five together in a close head, purplish; with long, narrow, purplish bractes: the fruit small red. While young, it is also woolly, but when further advanced naked. It is a native of the Pyrenees, &c.

The fifth is a low shrub, seldom more than five feet high, dividing into several smooth branches, covered with a purplish bark: the leaves grow upon long slender foot-stalks; are an inch and a half long, and an inch broad, smooth on both sides, and serrate: the flowers come out in small bunches at the ends of the branches; are about the size of those of the common Hawthorn, and succeeded by small fruit of a purplish colour. It is a native of Canada and Virginia, flowering in April and May.

The sixth species is a low spreading shrub, not more than four or five feet high, covered with a smooth ash-coloured or purple bark, when young pubescent, but becoming smooth with age: the leaves alternate, the upper surface bright green and smooth, the lower white-tomentose, finely netted, about an inch long, and three quarters of an inch broad: the petioles two lines in length, channelled above: there are two lanceolate, acuminate, deciduous, reddish stipules at the base of the petioles: the peduncles either solitary and unbranched from the tops of the twigs, or forming little corymbs of three or four flowers, which are peduncled, somewhat-nodding, round and pubescent, with a small bract at the base. It is a native of many parts of Europe and Siberia, flowering in April and May.

The seventh has a smooth stalk about eight feet high, dividing into many smooth branches: the leaves are two inches and a half long, of a thick substance, dark green on their upper side, but downy on the under, standing upon short foot-stalks: the flowers come out of the side of the stalk, upon short small branches, five or six

growing upon each in a close bunch: the petals are of a purple colour, little longer than the calyx, which is woolly, with blunt segments: the fruit is large, roundish, and of a fine red colour when ripe. It flowers in April and May.

The eighth species is a bushy irregular shrub: the branches strigose and rugged, testaceous-brown, divaricated, alternately spinose: the spines are axillary, commonly branched with secondary spines, sometimes gemmiferous and producing branchlets: the leaves scattered, smooth, petioled, continuing till winter, lanceolate with a point, crenate; but in the garden serrate: the corymbs copious on the branches, compound, subsessile, or elevated on the leafy branchlets, on divaricating peduncles: the flowers white, scarcely larger than those of Elder: the berry globular, fulvous, the size of a pea, umbilicated with the calyx; pulpy and five-seeded. But according to Scopoli, the fruit is as large as the common Medlar; the seeds subovate and compressed. It is a native of the South of Europe, flowering in May.

Culture.—They are all easily raised by seeds, layers, grafting and budding; but it is the best practice to raise the Medlar kinds principally by grafting or budding, in order to continue the sorts. In the first method, the seeds should be sown in autumn, in a bed of common earth, as they usually lie a year, or more, before they germinate, as in the haw and holly-berries, &c.

When the plants appear they should be watered frequently in dry weather; and in the autumn or spring following, the largest be thinned out and planted in nursery-rows, two feet by one asunder; and in another year all the rest may be set out in the same manner; and in three or four years they will be proper for being planted out in the garden or shrubbery.

In the second mode the young branches should be laid down in the autumn in the common method; and they will be properly rooted by the autumn following, when they should be planted out in nursery-rows in the same way as the seedlings.

The two last methods should be performed on stalks of the larger Medlar kinds, or sometimes upon those of the White Thorn, raised from seed, as above; but the Pear-stock is to be preferred for the common Medlars, when intended as fruit-trees. The operations are performed in the usual way, low in the stocks to form dwarfs; and for half or full standards, training the first shoot for a stem, or the stock may be let form a stem, and then be wrought at from about three or four to five or six feet in height. See BODDING and GRAFTING.

Those intended for fruit-trees, whether dwarfs, half or full standards, in training, should,

for dwarfs, have the first shoots from the graft or bud headed down short in spring, if necessary, in order to force out a proper supply of bottom branches, which must be trained as other dwarf fruit-trees, either for standard-dwarfs or espaliers. When for half or full standards, and wrought low in the stock, the first shoot of each should be trained for a stem, topping it afterwards at the proper height to force out lateral shoots to form the head; but when wrought high in the stock, the first shoots may either be shortened or suffered to grow, as may seem most proper, according to the natural disposition of the leading shoot, in respect to its furnishing lateral branches. After this training for the first year or two, to give the trees their first proper formation, there should not be any further general shortening of the branches, practising it only occasionally to particular shoots, to procure more wood, when necessary, to fill vacancies, to reduce any irregular growth, or to cut off dead parts.

In other respects the branches should be principally left at full length, and the standards left to assume nearly their own natural way of branching. See PRUNING and TRAINING.

They are all hardy, succeeding in any common soil and situation.

The first sort and varieties are cultivated as fruit-trees, principally as standards, but sometimes as espaliers for variety; and are often introduced into the shrubbery plantations. All the other species are proper for ornament in shrubbery or other plantations, where they effect a fine variety, by their different foliage and flowers, as well as their fruit in autumn and winter, which remains long on the branches. They should be disposed—the deciduous kinds principally in assemblage with others of that sort, and the ever-green kind also chiefly with those of their own sort, arranging each sort according to its height of growth; but the last sort, being agreeably ornamental, both as an ever-green and in its numerous clusters of fine red berries in winter, should have a conspicuous situation. From its being of a rather slender growth, it is however commonly trained against walls or the fronts of houses, for the support of its flexible branches, as well as to exhibit its berries more ornamentally. It may however be trained as a standard shrub, like the other sorts, in the open shrubbery; in which case it should be generally trained with short single stems, and permitted to branch out upwards into spreading heads.

MESUA, a genus containing a plant of the exotic shrubby kind, for the hot-house.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Guttiferae*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate, concave, blunt, permanent; the two outer smaller ones opposite: the corolla has four petals, retuse, waved: the stamina are numerous filaments, capillary, the length of the corolla, connate at the base into a pitcher: anthers ovate: the pistillum is a roundish germ: style cylindric: stigma thickish, concave: the pericarpium is a roundish nut, acuminate, with four longitudinal raised sutures: the seed single and roundish.

The species is *M. ferrea*, Ferreous Indian Mesua.

In its native situation it is a tree with opposite lanceolate leaves, five times as long as the internodes, quite entire, the upper surface smooth and green, the under glaucous and smooth; on very short petioles: the flower in each axil of the leaves sessile: the petal very large and rounded: the germ within the calyx: the style thick, the length of the stamens: the stigma capitate. According to Rheede, it is a very large tree, spreading like the lime, with flowers the size and shape of the wild rose or sweet brier, being much cultivated in Malabar for the beauty of the flowers, which come out there in July and August: and bearing smooth green fruit in six years from the nut. It is a native of the East Indies.

Culture.—This plant may be increased by seeds, layers, and cuttings.

The seeds should be sown in the spring, in pots of light earth, plunging them in a bark hot-bed in the stove. When the plants have attained some growth, they should be planted in separate pots and replunged in the bark-bed, where they must be kept.

The layers should be made from the young branches, and be laid down in the autumn or early spring, being taken off when well rooted, and planted in separate pots, having the same management as the others.

The cuttings should be taken from the young branches and be planted in the summer, in pots of light mould, and plunged in the bark-bed. When they have stricken root, they should be removed into separate pots, and be managed as the others.

They afford variety among other stove plants. MICHAUXIA, a genus containing a plant of the herbaceous, flowering, exotic kind.

It belongs to the class and order *Ocandria Monogynia*, and ranks in the natural order of *Campanaceae*.

The characters are: that the calyx is a one-

leafed perianthium, sixteen-parted: segments lanceolate, unequal, the alternate ones reversed: the corolla one-petalled, wheel-shaped, eight-parted, larger than the calyx: segments linear-lanceolate, spreading very much, revolute at the tip: nectary eight-valved, stamiferous: the stamina have eight awl-shaped, permanent filaments: anthers linear, very long, pressed close to the style: the pistillum is an inferior, turbinate germ: style columnar, permanent: stigma eight-parted: segments awl-shaped, revolute: the pericarpium is a turbinate capsule, truncated, eight-celled, valveless: cells rhomboid: the seeds very numerous, small, oblong, inserted into the receptacles.

The species is *M. campanuoides*, Rough-leaved Michauxia.

It is a handsome biennial plant: the stem simple, paniced when in flower, upright, herbaceous, rough-haired, green, two feet high, the thickness of the little finger, milky, as are also the branches, peduncles and calyxes: the branches alternate, axillary, flowering all over, spreading, reclining at the end: the root-leaves are petioled, cordate; the next petioled and runcinate: the stem-leaves half-embracing, lanceolate, acute, widening into ears at the base, irregularly gashed, serrate, nerved, wrinkled, rough-haired, rigid, waved, ascending at the sides, purple at the edge, four inches long, an inch and a half wide: the flowers are in a panicle, peduncled, bracted, hanging down, white, four inches in diameter: some slightly tinged with purple on the outside. It was found in the Levant.

Culture.—It may be raised from seed procured from its native situation and sown in the early spring season, in pots plunged in a hot-bed, or on a moderate hot-bed. When the plants have attained a little growth they should be removed into separate pots and be re-plunged in the hot-bed. It must afterwards be managed as tender green-house plants.

It affords variety in collections of this sort.

MICHELIA, a genus containing a plant of the tree or shrub kind.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Coarctatae*.

The characters are: that the calyx is a three-leaved perianthium: leaflets petal-form, oblong, concave, deciduous: the corolla has fifteen petals, lanceolate; the outer ones larger: the stamina have very many awl-shaped filaments, very short: anthers erect, acute: the pistillum has numerous germs, imbricate in a long spike: styles none: stigmas reflex, blunt: the pericarpium berries (berried capsules) as many,

globular, one-celled, half-bivalved, dispersed in a raceme: the seeds four, (from two to eight,) convex on one side, angular on the other.

The species is *M. Champaca*, Champaca or Indian Michelia.

In its native situation it is a lofty tree, with a trunk as large as a man can compass, covered with a thick ash-coloured bark, but in this climate it is only the size of a shrub: the leaves are a span or more in length, and four or five inches in width, contracted into an oblong narrow point, of a hard texture, flat and smooth, dusky green above, brighter green beneath, on petioles an inch in length: the flowers on the extreme twigs, axillary, on thick, upright peduncles an inch and a half in length, and having a very fragrant smell: the petals narrow, in three rows; in the outer row eight, three times as broad as those in the middle row, which are also eight; towards the top they are more round and sometimes pointed or cusped, but less so than in the middle row: in the inner row they are small, short, very much cusped towards the top, pale yellow: fruit oblong spheroidal, with a thickish rind, first green, then pale whitish yellow, having a very sharp taste, and not very pleasant smell. It is a native of the East Indies.

Culture.—This plant may be increased by seeds, layers, and cuttings, managed in the same manner as the above sort.

It affords variety in collections of stove plants.

MILFOIL. See ACHILLEA.

MICE, a sort of vermin highly destructive to several sorts of garden crops, such as peas and beans in the early spring, and lettuces, melons and cucumbers in frames in the winter season. When discovered they should be immediately destroyed. See VERMIN.

MILDEW, a vegetable disease very hurtful to some kinds of plants. It is supposed to proceed from different causes: some consider it as a kind of thick clammy moisture, which falls on, or rather transpires from, the leaves and blossoms of plants, which, by stopping up the pores, prevents perspiration, and hinders their growth. The author of *The Philosophy of Gardening* suspects it to be a plant of the fungous kind, which grows without light or change of air, and with its roots penetrates the vessels of the vegetables to which it adheres, which are probably previously diseased, and thus deprives them of their due nourishment. But what is commonly denominated mildew is an insect which is frequently found in vast numbers feeding upon the effused moisture. In a treatise upon this

disease by Mr. Segar, it is conceived to be of a very sharp corrosive nature, and by its acrimony to hinder the circulation of the nutritious sap; in consequence of which the leaves begin to fade, and the blossoms and fruit to be greatly injured.

The author first mentioned conceives the best method of removing it to be by admitting more light and air, by proper thinning or pruning so as to restore the natural vigour of the plants.

Mr. Forsyth has observed that, "contrary to the common opinion, trees are more liable to mildew on south and west walls, than on an east wall; and has frequently removed such trees from a south or west wall, to a north or east wall, where they have perfectly recovered.

He advises "whenever danger is apprehended, to wash or sprinkle the trees well with urine and lime-water mixed; and when the young and tender shoots are much infected, to wash them well with a woollen cloth dipped in the following mixture, so as to clear them of all the glutinous matter, that their respiration and perspiration may not be obstructed.

"Take of tobacco one pound, sulphur two pounds, unslaked lime one peck, and about a pound of elder-buds; pour on them ten gallons of boiling water; cover it close and let it stand till cold; then add as much cold water as will fill a hogshhead. It should stand two or three days to settle, when the scum may be taken off, and it is fit for use.

"There is a sweet saccharine substance found on the leaves of certain trees, which is generally but erroneously supposed to fall from heaven like dew. It is known by the title of *Honey-dew*. There are supposed to be two kinds of it, one of which Mr. Forsyth says "transpires from the leaves of the trees where it is found; and the other is the excrement of a small insect called a Vine-fretter, a species of the Aphis. Bees and ants are very fond of both these kinds of honey-dew." As this exudation, "by its viscous quality," closes up the pores and stops the perspiration of trees, it must of course," he thinks, "be very hurtful to them."

It is a vegetable disease, which should, in his opinion, be treated in the same manner as the mildew, by washing at the same times.

MIMOSA, a genus containing plants of the shrubby and under shrubby kind.

It belongs to the class and order *Polygamia Monœcia* and ranks in the natural order of *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianthium, five-toothed, very small:

the corolla has one petal, funnel-form, half-five-cleft, small: the stamina have capillary, very long filaments: anthers incumbent: the pistillum is an oblong germ: style filiform, shorter than the stamens: stigma truncated: the pericarpium is a long legume, with several transverse partitions: the seeds many, roundish, of various forms.

The species cultivated are: 1. *M. plena*, Double-flowered Annual Sensitive Mimosa; 2. *M. viva*, Lively Mimosa; 3. *M. quadrivalvis*, Quadrivalve-podded Humble Mimosa; 4. *M. sensitiva*, Sensitive Plant; 5. *M. pudica*, Humble Plant; 6. *M. virgata*, Long-twiggèd Mimosa; 7. *M. punctata*, Spotted-stalked Mimosa; 8. *M. pernambucana*, Slothful Mimosa; 9. *M. asperata*, Hairy-podded Mimosa; 10. *M. pigra*, Slow American Sensitive Plant; 11. *M. glauca*, Glaucous Mimosa; 12. *M. cornigera*, Horned Mimosa, or Cuckold Tree; 13. *M. horrida*, Horrid Mimosa; 14. *M. Farnesiana*, Farnesian Mimosa, or Sponge Tree; 15. *M. Nilotica*, Egyptian Mimosa; 16. *M. verticillata*, Whorl-leaved Mimosa; 17. *M. arborea*, Rough Tree Mimosa; 18. *M. Lebbeck*, Lebbeck, or Egyptian Mimosa; 19. *M. latisiliqua*, Broad-podded Mimosa; 20. *M. tamarindifolia*, Tamarind-leaved American Mimosa; 21. *M. circinalis*, Spiral Mimosa; 22. *M. pennata*, Small-leaved Mimosa; 23. *M. latifolia*, Broad-leaved Mimosa; 24. *M. purpurea*, Purple Mimosa, or Soldier Wood; 25. *M. reticulata*, Netted Mimosa; 26. *M. scandens*, Climbing Mimosa; 27. *M. myrtifolia*, Myrtle-leaved Mimosa; 28. *M. suaveolens*, Sweet-scented Mimosa.

The first, when cultivated in the garden, has great resemblance to the seventh sort; but the stalks never grow so erect, the wings of the leaves are longer, and stand more horizontal: the heads of flowers are much larger, the stamens are longer, and the flowers on the under side of the spike which have no stamens are double; the pods also are shorter, and much broader than those of that sort.

It is annual; the stems round, herbaceous, smooth, procumbent, rooting at all the joints: the leaves three-paired or four-paired, contracting with the least touch: from the axils of these spring erect peduncles, four or five inches high, with scales the whole length, sustaining handsome, yellow, almost globular heads, the same size with those of red clover: the flowers different in shape, nature and use; those in the middle truly five-petalled, in small five-cleft calyxes, with many long stamens; but those in the circuit, instead of stamens have oblong, beautiful, golden leaflets, much wider and handsomer than the true petals, which are small

and of a greenish colour. These double flowers are barren; but the single ones are succeeded by flat, smooth, two-valved legumes, containing several black, shining, compressed seeds. It is a native of La Vera Cruz.

The second species has trailing herbaceous stalks, putting out roots at every joint, and spreading to a considerable distance: A single plant, in the stove, in one summer, has spread near three feet square, and the branches so closely joined, as to cover the surface of the bed; but when permitted to grow thus, the plants seldom produce flowers: the leaflets are narrow, and the petioles are short and smooth: the flowers axillary, on naked peduncles about an inch in length; they are of a pale yellowish colour, and are collected into small globular heads: the legumes short, flat, jointed, containing three or four compressed, roundish seeds. It is a native of Jamaica.

The third has a creeping root: the stalks slender, having four acute angles, armed pretty closely with short recurved spines: the leaves on long prickly foot-stalks, and thinly placed on the branches: the wings two pairs, about an inch asunder, short: the leaflets narrow, not very close: the peduncles axillary, sustaining a small globular head of purple flowers: the legumes four-cornered, two inches long, four-celled, four-valved; containing several angular seeds in each cell. It was found at La Vera Cruz.

The fourth species rises with a slender woody stalk, seven or eight feet high, armed with short recurved thorns: the leaves grow upon long foot-stalks which are prickly, each sustaining two pairs of wings; the outer pair has two lobes which join at their base, and are rounded on the outside, but straight on the inner edges, shaped like a pair of sheep-shears; they are much larger than the inner, are almost two inches long, and one inch broad in the middle: from the place where these are inserted into the stalk, come out small branches, which have three or four globular heads of pale purplish flowers coming out from the side, on short peduncles; and the principal stalk has many of those heads of flowers on the upper part for more than a foot in length; and this, as also the branches, is terminated by similar heads of flowers: the pods are broad, flat, jointed, opening by two valves, containing one, two, or three compressed orbicular seeds: the leaves move but slowly when touched, but the foot-stalks fall when they are pressed very hard. It is a native of Brazil.

The fifth has the roots composed of many hairy fibres, which sit close together, from

which come out several woody stalks, which decline towards the ground, unless they are supported; they are armed with short recurved spines, and have winged or pinnate leaves, composed of four, and sometimes five pinnae, whose bases join at a point, where they are inserted into the foot-stalk, spreading upwards like the fingers of a hand: the flowers from the axils, on short peduncles, collected in small globular heads, of a yellow colour: the pods short, flat, jointed, in close clusters, almost covered with stinging hairy covers. It is a native of Brazil.

The sixth species has the spike roundish, nodding: the flowers ten-stamened, and yellow; the lower ones of the spike without stamens or petals. It is a native of the West Indies, flowering in July and August.

The seventh rises with upright branching stalks six or seven feet high, becoming woody towards the root, with callous dots dispersed upon it, but not perennial (at least they are not so here in any situation, the plants always decaying in winter); they are smooth, and the leaves are composed of four or five pairs of long winged lobes, which have about twenty pairs of small leaves ranged along the midrib; are smooth and rounded at their points, of a full green on their upper side, but pale on their under: these small leaves contract themselves together on their being touched, but the foot-stalks do not decline at the same time, as those do which are titled Humble Plants: it is therefore called the Sensitive Plant by way of distinction: the flowers are produced upon long foot-stalks, which come out from the wings of the leaves, and are disposed in globular heads which nod downward, are yellow; and all those which have petals have ten stamens in each, but those situated round the border have neither petals nor stamens; those on the upper part of the spike are succeeded by pods an inch and a half long, and a quarter of an inch broad, which change to a dark brown when ripe, inclosing three or four compressed, shining, black seeds. It is probably a native of America.

The eighth species has the stems seldom more than two feet and a half high, and smooth: the leaves are composed of three or four pinnae, which are shorter, and the leaflets much narrower than in the first and seventh sorts: the heads of the flowers are smaller, being made up of many long white filaments, forming altogether a round head, and the pods longer and narrower, an inch long, and a quarter of an inch broad, with a round protuberance at each seed. It grows naturally in all the islands of the West Indies, where it has its name from the leaves not contracting on being touched.

The ninth species has a shrubby erect stalk about five feet high, hairy and armed with short, broad, strong thorns, which are white, standing on each side, almost opposite, or alternate: the leaves five- or six-paired, with a strong midrib, and between each pair two short strong spines, pointing out each way: the leaflets extremely narrow and very close: towards the upper part of the stalk the flowers are produced from the sides on short peduncles; they are collected into globular heads, and are of a bright purple colour: the stalks are also terminated by smaller heads of the like flowers: the pods flat, jointed, about two inches long, and a quarter of an inch broad, spreading like rays, there being commonly five or six joined together at the base: they separate at each articulation, leaving the two side membranes or borders standing: the seeds, which are compressed and square, drop out from the joints of the pods, which are hairy at first, but as they ripen become smooth: the petioles do not fall on being touched, but the leaflets close up. It is a native of La Vera Cruz.

The tenth has the stem recurved, prickles scattered over it in pairs: the leaves commonly six-paired, with many paired pinnae: on the universal petioles there are recurved prickles between each of the partial ones; and there is a straight upright prickle which is longer, between each pair of the partial ones, in place of a gland: the heads are globular: the legumes membranaceous-compressed, jointed, rugged. It is a native of South America.

The eleventh species has the spikes globular, large, peduncled: the flowers white, apetalous, ten-stamened: the legumes long, flat. It flowers in April, and the seeds ripen in autumn; found at La Vera Cruz.

The twelfth is a tree which seldom exceeds twelve feet in height: it has numerous branches forming a pyramidal figure: the leaves are small; the flowers are small, yellow, and void of scent, in a close cylindrical spike, an inch and a half long: the legumes coriaceous, containing a buttery pulp, in which the seeds are rolled up: the spines are very singular, subaxillary and connate at the base, resembling the horns of oxen; brown, shining, hollow, and the longest more than five inches in length; they are all over the tree; and when the pods are ripe and the leaves fallen, they have a singular appearance. It is a native of Carthage, flowering in June and July, and ripening seeds in September.

The thirteenth species has the branches angular, smooth, with a brown bark: the leaves sometimes two from the axil of the spines: partial four- or five-paired, inner shorter, with

leaflets from five- to seven-paired, outer eight- to eleven-paired: leaflets linear, acute, smooth: the spines in pairs white, purple at the tip: the flowers in a globular head, axillary and solitary, first sessile, then peduncled, shorter than the leaves: the legumes compressed, and attenuated at the base. It is a native of the East and West Indies, &c.

The fourteenth has the flowers many-stamened, very fragrant, yellow, in sessile heads: the petioles have a gland below the leaflets: the legumes are fusiform. On account of the sweetness of its flowers, it has been dispersed through most parts of Europe. It is brought by the Italian gardeners, who bring over Orange-trees, &c. in young plants, under the name of *Gazia*. It is a native of Saint Domingo, flowering from June to August.

The fifteenth species is a tree which arrives at a large size in countries where it grows naturally, but in this climate is rarely seen more than eight or ten feet high: it has the habit of the fourteenth sort; differing in having no callous dots upon the branches: the bark is purple: the spines in pairs, and longer than those of the fourteenth: the branches purple, even: the partial leaves about five pairs; between two pairs of the outer ones a gland is inserted into the common petiole: the legumes necklace-shaped, compressed: the joints roundish-rhomb-shaped: flowers many-stamened, in peduncled heads. It is a native of Egypt and Arabia. It is the tree which yields the Gum Arabic.

The sixteenth has leaves simple, linear, and pungent or hard and prickly at the end, and growing in whorls six or seven together; but it has dissimilar leaves, and the primordial ones, or two or three first leaves which appear on the seedling plants, are bipinnate. It is a native of New South Wales, flowering from March to May.

According to Mr. Curtis, it is some years in arriving at its flowering state.

The seventeenth is a lofty tree, with an upright smooth trunk, covered with an ash-coloured bark: the branches diverging, bent down, smooth: the partial leaves twelve-paired: the universal petiole round, striated, ferruginous-pubescent: partial petioles also ferruginous: the glands roundish, concave, between the petioles: the scalelets bifid, minute, at the base of the partial petioles: pinnae sixteen- or eighteen-paired, halved, subsessile, acute, entire, smooth: the spikes peduncled, subglobular, composed of aggregate, sessile, white flowers: the peduncles axillary, and slender: the seeds spherical, shining black. It is a native of Jamaica, where it is called *Mountain or Wild Tamarind Tree*.

The eighteenth has the leaves destitute of glands : the pinnae from twelve to twenty, an inch in length : the bundles of flowers peduncled : the legume a span long. It is cultivated in the gardens at Cairo, where it flowers in June, and becomes a large tree. It is probably a native of Egypt.

The nineteenth has the bractæ half-cordate : the peduncles in threes : the flowers in heads : an obsolete gland on the common petiole below the partial pinnae : the germs are globular, two-valved ; with two roundish, concave or hemispherical leaflets : the leaves very smooth. It is a native of the West Indies, flowering most part of the summer.

The twentieth species has the branches with few recurved prickles : the leaves four- or five-paired : a gland between the lowest partial ones, which are twelve-paired, but the lowest pinnule wants the opposite on the inside : on the common petiole are two remote prickles, underneath between each partial one : the stipules wide, acuminate, purple : the legumes very wide. It is a native of America.

In the twenty-first, the leaves divide into many ramifications : the leaflets are roundish, and placed in a very regular order : the seeds, which are flat, and one half of a beautiful red colour, the other half of a deep black, grow in long twisted pods, and hanging by a small thread for some time out of the pod, when they are ripe, make a very agreeable appearance. It was brought from the Bahama Islands.

The twenty-second species is frutescent, being a large procumbent branching shrub : the panicle very much branched, naked, terminating the stem and branches : the prickles small, scattered over the stem and panicle : the leaves having from twelve to twenty pairs of partial leaves, with an oblong melliferous pore at the base of the general petiole : the leaflets linear and almost capillary : there are no prickles on the petioles or peduncles, but a gland above the base of the petioles : the flowers white, polygamous, in a vast diffused terminating panicle, of very many small globular heads. It is a native of the East Indies.

The bark is there converted into a sort of tow, which is used for stopping cracks both in houses and boats.

The twenty-third sort has the flowers many-stamened, sessile : the leaves are like those of the Walnut ; and the flowers are purple. It is a native of South America.

The twenty-fourth has also purple flowers, and is a native of South America.

The twenty-fifth is a tree with rigid branches, that are flexuose from bud to bud : under each

bud is a pair of horizontal, whitish, stipular thorns, the length of the leaves : the leaves are petioled, conjugate, or one-paired, with pinnate, six-paired leaflets : the common petiole terminated above by a gland, beneath by a prickle : the leaflets oblong-linear, blunt, at equal distances, the lowest smaller : the legume oval, a hand in length and half as much in breadth, compressed, with large scattered seeds. It is a native of the Cape.

The twenty-sixth climbs to the tops of the tallest trees, to the height of one hundred and fifty feet, frequently overspreading many of the neighbouring branches, and forming large arbours : the withs are slender, but tough and flexile, striated, stiff, and smooth : common petioles long, opposite, thickened at the base, round, very smooth, terminating in a tendril, by which the branches are supported : the pinnae four-paired, petioled, oblong, blunt at top, emarginate, nerved, smooth on both sides, shining : the glands none : the tendril long, upright, bifid at the end : the spikes axillary, erect, very long, many-flowered : the flowers approximating, subsessile, small : most of them are abortive : and according to Browne, the female plants throw out their flowers separate, and are succeeded by so many pods. It is a native of both Indies, and in the West Indies is called *Cocoon*.

The twenty-seventh species is in height three or four feet : the branches alternate, upright, angular, with a very tough smooth bark : the leaves of the young seedlings in pairs and pinnate, with oval leaflets : but when the stem rises, the common footstalks of its leaves become dilated, the leaflets cease to appear, and the whole shrub is furnished only with such dilated naked footstalks, which are to all intents and purposes leaves. They are alternate, vertical, smooth, firm and glaucous : the stipules none : on their upper edge near the base a small concave gland : the racemes are axillary, solitary, erect, of about six alternate heads, each having three or four small white flowers : the pod linear, pointed, zigzag, brown, with a very thick margin : the seeds about six, oblong : the flowers on the young branches are very numerous, and fragrant, like those of *Spiræa Ulmaria*. It is a native of New South Wales.

It produces ripe pods, and perfects seeds in the stove, but in the green-house the flowers go off without any tendency to produce fruit. It is a shrub of quick growth, and which blows very readily.

According to Mr. Curtis, the foliage is usually edged with red.

In the twenty-eighth the branches are most

acutely triangular, and much compressed; their edges bright red: the leaves alternate, four or five inches long, with a rib and margin like the last: the flowers in axillary racemes, yellowish white, fragrant: the petals four: stamens numerous: the young capsules smooth and glaucous. It is a native of New South Wales.

Culture.—They are all capable of being increased by seed, and some of the sensitive kinds by layers and cuttings, but the first is by much the best method.

The seed, procured from the nurseries or seed-shops, should be sown in pots of light rich mould early in the spring, covering it in with fine earth a quarter of an inch deep, and plunging the pots in the hot-bed; if in a common hot-bed under frames and glasses, managing them nearly in the manner of tender annuals, and when in a bark-bed in the stove, little trouble is required. But moderate sprinklings of water should be given; and when the plants are two or three inches high, they should be planted out singly into small pots, preserving the earth to their roots, replunging them in the hot-bed, &c., giving water and occasional shade till they are well rooted, repeating the waterings frequently. The plants should afterwards be continued either in the hot-bed under glasses, or plunged in the bark-bed of the stove, to facilitate their growth, preserve them in vigour, and increase the sensibility of the Sensitive kinds; admitting fresh air pretty freely.

The perennial sorts, both shrubby and herbaceous, must be kept in the stove all winter, and principally the year round.

And they must be frequently removed into larger pots to prevent the roots from getting through the pots, which they are apt to do, and by that means are often destroyed.

The *Acacia* kinds are the most tender, requiring the stove almost constantly, except a little in the heat of summer, when they must be placed in a warm situation.

They should always have a bark hot-bed, and be put in very small pots filled with sandy mould, the heat of the stove being kept up to above temperature as the leaves of some of them are shed, they have often the appearance of being dried when that is not the case.

Where there is not the convenience of a stove, those who are curious to have the plants, may have them in summer, by the aid of a common dung or tan-bark hot-bed under frames and glasses, though not in winter; by raising some of the annual, or any of the other kinds, by seed in spring, in a hot-bed under a frame, &c. keeping up the heat of the bed until the middle of June, and continuing the plants always un-

der the frame, raising one end of the lights a little, occasionally, in warm days to admit fresh air; and as they rise in height, raise the frame at bottom, to allow them full room to grow. About Midsummer, or soon after, some of the low spreading kinds may likewise be turned out with balls, or plunged in their pots into a warm sunny border, and covered with large hand-glasses, which may be lifted off occasionally just to view the plants. By these methods the plants may be preserved through the summer in their sensitive quality, though not equal in perfection to those in stoves; nor can they be preserved alive in winter out of the stove.

The shrubby kinds that afford spreading branches may be layed any time in summer, in pots plunged in the bark-bed, where they then take root, and are ready to pot off singly in the autumn season.

The Sensitive and Humble sorts often branch out profusely, so as to furnish plenty of young shoots for cuttings, which should be planted in pots in the summer season, plunging them in the bark-bed, where they often readily take root, and form good plants.

These modes should, however, only be practised when seed cannot be procured.

The general culture of all the species is afterwards to keep them always in pots placed in the stove, being plunged occasionally in the bark-bed, especially the Spreading Sensitive kinds, frequent waterings being given in summer and winter, but considerably the most in the summer season; shifting them into larger pots as they increase in growth. And although most of the sorts will live in the open air in the heat of summer, it is the best practice to expose them but sparingly.

The fourth and fifth sorts are held in high estimation on account of the singular sensibility lodged in their leaves; which, in consequence of being touched or shaken, either by the hand, a stick, or the least wind blowing upon them, the wings of the leaves suddenly close, and the foot-stalks fall down.

The periods of time which the leaves, &c. require to recover themselves, after falling from any irritation, are according to the vigour of the plant, the hour of the day, the serenity of the atmosphere, and the temperature of the heat of the stove, &c. being often from ten or fifteen minutes to an hour or more.

The plants also every evening naturally contract themselves, and expand again in the morning. They are all ornamental and curious.

MIMULUS, a genus containing a plant of the herbaceous flowery ornamental kind.

It belongs to the class and order *Didynamia*



Painted by Val. Edwards
Mirabilis jalapa
 'Marvel' of Peru.

London Published Mar 1180 by G. Knapp, Fleet Street
 2 *Mimosa sensitiva*
 Sensitive Plant.

Engraved by F. Sanfey
 3 *Monarda didyma*
 Scarlet Monarda.

Angiospermia, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leafed perianthium, oblong, prismatic, five-cornered, five-folded, five-toothed, equal, permanent: the corolla is one-petalled, ringent: tube the length of the calyx: border two-lipped: upper lip upright, bifid, rounded, bent back at the sides: lower lip wider, trifid, with the segments rounded; the middle one smaller: palate convex, bifid, protruded from the base of the lip: the stamina have four filaments, filiform, within the throat; two shorter: anthers bifid-kidney-form: the pistillum is a conical germ: style filiform, the length of the stamens: stigma ovate, bifid, compressed: the pericarpium is an oval, two-celled capsule, opening transversely at top: partition membranaceous, contrary to the valves: the seeds very many, and small: the receptacle oblong, fastened on each side to the partition.

The species cultivated are: 1. *M. ringens*, Oblong-leaved Monkey-flower; 2. *M. alatus*, Wing-stalked Mimulus; 3. *M. aurantiacus*, Orange Monkey-flower.

The first has a perennial root: the stalk is annual, square, a foot and half high, with two oblong smooth leaves at each joint, broadest at their base, where they join round the stalk, but ending in acute points: the lower part of the stalk sends out two or three short branches, and the upper part is adorned with two flowers at each point, from the bosom of the leaves on each side; they are of a violet colour, and have no scent. It is a native of Virginia and Canada, flowering in July and August.

The second species has the appearance of the first sort: the stem is winged with four membranes running down from the base of the petioles, simple, smooth, with a branchlet or two at top: the leaves are two inches long, veined, unequally serrate: the peduncles axillary, solitary, opposite, four-cornered, thickened at top. It is a native of North America, flowering in July and August.

The third has the stalk about three feet high, much branched, shrubby, round, the young wood green, with a tinge of purple towards the lower part of each joint, slightly viscid, as it becomes older changing to a light-brown colour, and discovering manifest fissures: the branches alternately opposite, flower-bearing quite to the base: the leaves are opposite, sessile, slightly connate, the bluntness at the end particularly apparent when contrasted with a leaf of the first sort, toothed or slightly serrate, smooth, veiny: the flowers inodorous, large, nearly twice the size of those of the first sort, uniformly pale orange, growing in pairs from the axils of the

leaves, on peduncles that are about half the length of the calyx. It flowers during most of the summer.

Culture.—This plant is very hardy in respect to cold, but should have a loamy soft soil, rather moist than dry, and not too much exposed to the sun.

The first sort may be increased by parting the roots not too small, and planting them in autumn, or the early spring, but the former is the better season. It may also be raised by seeds, which should be sown in autumn, soon after they become perfectly ripe, on a border exposed to the morning sun.

The third sort may likewise be increased in the same manner.

The fourth kind is best propagated by planting cuttings of the young shoots or branches in the early spring in pots of fresh mould, plunging them in a mild hot-bed, being afterwards managed as the other sorts.

The first is capable of bearing cold when planted in a loamy, soft, rather moist soil, not too much exposed to the sun.

This and the second sort may be introduced in the borders and clumps, and the third among other potted plants of the less tender kinds.

MINT. See MENTHA.

MIRABILIS, a genus furnishing plants of the flowery perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Nyctagines*.

The characters are: that the calyx has the outer perianthium one-leafed, erect-ventricose, inferior, five-parted: segments ovate-lanceolate, sharp, unequal, permanent: inner globular placed under the petal, with a contracted entire mouth, and permanent: the corolla is one-petalled, funnel-form: the tube slender, long, thicker at top, placed on the inner calyx: border from upright spreading, entire, bluntly five-cleft, plaited: nectary spherical, fleshy, surrounding the germ, with a five-toothed mouth: teeth very small, triangular, converging: the stamina have five filaments inserted into the orifice of the nectary, and alternate with its teeth, within the inner calyx free, more slender, fastened at bottom to the tube of the corolla, filiform, the length of the corolla, inclining, unequal: anthers twin, roundish, rising: the pistillum is a turbinate germ, within the nectary: style filiform, the length and situation of the stamens: stigma globular, dotted, rising: there is no pericarpium: the inner calyx incrusts the seed and falls with it: the seed single, ovate-five-cornered.

The species cultivated are: 1. *M. jalapa*, Common Marvel of Peru; 2. *M. dichotoma*,

Forked Marvel of Peru; 3. *M. longiflora*, Sweet-scented Marvel of Peru.

The first has a thick fleshy root: the stem thick, upright, much branched, and divided three feet or more in height: the leaves are broad, oblong, and opposite: flowers terminating, about six, in clusters close together without any leaflets between them, and not longer than the leaf. It is perennial, and a native of both the Indies, flowering from July to October.

There are several varieties in the colour of the flowers, as purple or red, white, yellow, variegated purple and white, and variegated purple and yellow, but which resolve themselves into two principal varieties; as with purple and white flowers, which are variable; some being plain purple, others plain white, but most of them variegated with the two colours, and all found occasionally on the same plant; and with red and yellow flowers, generally mixed, but sometimes distinct on the same plant; some plants having only plain flowers, others only variegated, and others again both plain and variegated: but the plants which are raised from seeds of the purple and white never produce red and yellow flowers, or the contrary.

All these varieties are highly ornamental during the months of July, August, and September, and, when the season continues mild, often last till near the end of October. The flowers opening only towards the evening, while the weather continues warm, but in moderate cool weather, when the sun is obscured, they continue open almost the whole day, and are produced so plentifully at the ends of the branches, that when expanded the plants seem entirely covered with them, and from some being plain, others variegated, on the same plant, have a fine appearance.

The second species resembles the first sort very much: the stalks have thick swollen joints: the leaves are smaller: the flowers not much more than half the size, and do not vary in their colour from their natural purplish red: the fruit is very rough. It is a native of Mexico; and common in the West Indies, where it is termed the *Four o'Clock Flower*, from the circumstance of the flowers opening at that time of the day.

In the third, the stalks fall on the ground, if not supported; they grow about three feet in length, and divide into several branches; are hairy and clammy: the flowers come out at the ends of the branches, are white, have very long slender tubes, and a faint musky odour, as in the other sorts; are shut during the day, and expand as the sun declines: the seeds are larger than those of the other species, and as rough as those of the second sort. It is a native of Mexico, flowering from June till September.

Culture.—In all the sorts the propagation is effected by sowing the seed in the spring season, either on a warm border or in a hot-bed; but the latter method produces the plants considerably more early, and in the greatest perfection.

When cultivated on warm south borders, in the places where the plants are to remain, the seed should be sown about the middle of April, either in patches or in shallow drills, half an inch deep, and six inches asunder: and when the places can be covered with hand-glasses, or a frame and lights, or the seed be sown in pots under those protections, or any other occasional shelter during the night-time and in cold weather, it will greatly forward the germination of the seed, as well as the growth of the young plants afterwards. In the latter method, about June, the plants will be fit to plant out into the borders or into pots. Moist weather should be chosen for this purpose, and water and occasional shade be given till well rooted: they then readily grow, and acquire a tolerable size; but they do not attain to a large size, or flower so early by a month or six weeks as those forwarded in the hot-bed.

In the latter method, a hot-bed should be prepared in March, or early in April, under frame and lights, and earthed over about six inches deep; then sowing the seed in the earth of the bed in shallow drills half an inch deep, as directed above, or in pots of rich earth the same depth, plunging them in the earth of the bed. The latter is the better method. The plants soon rise; when they should have fresh air daily, in common with the other plants of the bed, and frequent refreshings of water; and when nearly two inches high, be planted out into another fresh hot-bed to forward them, placing them either in the earth of the bed, four or five inches asunder, or singly in small pots (thirty-twos), plunging them in the bed; water and shade should be immediately given till fresh-rooted, continuing the care of admitting fresh air every mild day; and about the middle or latter end of May, when they have acquired a good size and strength, they should be inured by degrees to the full air, so as that they may be removed into it fully about the beginning of June, choosing mild cloudy moist weather, if possible, for the business; taking up such as grow in the beds, with balls of earth about their roots, and planting them in the borders; but those in pots may be turned out with the whole ball entire, and planted in that way. Some should also be removed into large pots for moving into particular situations. Water should be directly given, and occasional shade to such as

require it, repeating the waterings to the whole, till they have struck fresh root and begun to grow, when they will not require any further culture, except the occasional support of sticks, which is most necessary in the last sort.

As the seed ripens well, it will frequently prevent the trouble of preserving the roots.

But when these are taken out of the ground in autumn, and laid in dry sand during the winter, secure from frost, and planted again in the spring, they grow much larger and flower earlier than the seedling plants: or when the roots are covered in winter with tanner's bark to keep out the frost, they often remain secure in the borders, where the soil is dry. When the roots thus taken out of the ground are planted the following spring in large pots, and plunged into a hot-bed, under a deep frame, they may be brought forward, and raised to the height of four or five feet, and flower much earlier in the season.

In collecting the seeds, care should be taken not to save any from the plants which have plain flowers; and in order to have variegated flowers, the plain flowers should be pulled off from those plants which are intended to stand for seed.

As the second sort is less hardy than the first and third, unless the plants are brought forward in the spring they seldom flower till very late, and their seeds do not ripen perfectly.

All the sorts are proper for the principal borders of pleasure-grounds, being very ornamental in their large branchy growth, as well as in their extensive flowering.

The root of all the sorts is a strong purgative.

MOLUCCA BAUM. See **MOLUCCELLA**.

MOLUCCELLA, a genus containing plants of the herbaceous annual exotic kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatae*.

The characters are: that the calyx is a one-leaved perianthium, very large, turbinate, gradually finishing in a very wide, bell-shaped, tooth-spiny, incurved, permanent border: the corolla is one-petalled, ringent, less than the calyx: tube and throat short: upper lip upright, concave, entire; lower lip trifid: the middle segment more produced, emarginate: the stamina have four filaments, under the upper lip, of which two are shorter: anthers simple: the pistillum is a four-parted germ: style the size and situation of the stamens: stigma bifid: there is no pericarpium: fruit turbinate, truncate, in the bottom of the open calyx: the seeds four, convex on one side, angular on the other, at top wide and truncate.

The species cultivated are: 1. *M. laevis*,

Smooth Molucca Baum; 2. *M. spinosa*, Prickly Molucca Baum.

The first has an annual root: the stem three feet high, spreading out into many branches, which are smooth, and come out by pairs: the leaves are roundish, deeply notched on their edges, opposite, on long petioles, smooth, light green on both sides: at the base of the petioles the flowers come out in whorls: immediately under the calyx also come out two bunches of pretty long spines, one on each side, each bunch consisting of five or six spines arising from the same point: the corolla is small, and being placed at the bottom of the large calyx is not visible at a distance; it is white with a cast of purple. It is a native of Syria, flowering in July and August.

In the second the root is also annual: the stems smooth, purplish, four feet high, branching out in the same manner with the first: the leaves are smaller, on shorter foot-stalks, deeper and more acutely indented on their edges: the calyx not so large, and cut into eight segments, each terminated by an acute spine: the flowers like those of the first sort. It is a native of the Levant, flowering in July and August.

Culture.—These plants may be increased by sowing the seeds in the early autumn on a mild hot-bed, or in pots plunged into it, and when the plants have attained a little growth be planted in small pots, and placed under a hot-bed frame in winter, where they may have free air in mild weather by taking off the glasses, being carefully covered in frosty weather, keeping them pretty dry, otherwise they are apt to rot. In the spring the plants may be turned out of the pots, with their earth about their roots, and planted in a warm border, defended from strong winds, giving them a little water to settle the earth to their roots; after which they require no other care but to be kept clean from weeds, and be supported with stakes.

They afford ornament and variety in the borders among other tender annuals.

MOLY. See **ALLIUM**.

MOMORDICA, a genus furnishing plants of the annual trailing and perennial kinds.

It belongs to the class and order *Momectia Syngenesia*, and ranks in the natural order of *Cucurbitaceae*.

The characters are: that in the male flowers the calyx is a one-leaved perianthium, concave, five-cleft: segments lanceolate, spreading: the corolla five-parted, fastened to the calyx, more spreading, large, veined, wrinkled: the stamina have three awl-shaped filaments, short: anthers on two filaments bifid, eared at the sides; on the third simple, one-eared only, consisting of a compressed

body and a fariniferous line once reflex: female flowers on the same plant: the calyx is a perianthium as in the male, superior, deciduous: the corolla as in the male: the stamina have three filaments, very short, without anthers: the pistillum is an inferior germ, large: style single, round, trifid, columnar: stignas three, gibbous, oblong, pointing outwards: the pericarpium is a dry, oblong pome, opening elastically, three-celled: cells membranaceous, soft, distant: the seeds several, and compressed.

The species cultivated are: 1. *M. balsamina*, Common Momordica, or Male Balsam Apple; 2. *M. charantia*, Hairy Momordica; 3. *M. Luffa*, Egyptian Momordica; 4. *M. elaterium*, Elastic Momordica.

The first has a trailing stem, like those of the Cucumber and Melon, extending three or four feet in length, and sending out many side branches which have tendrils: the leaves are shaped like those of the Vine, smooth, deeply cut into several segments, and spreading open like the hand. According to Martyn, the fruit is fleshy, ovate, drawn to a point at each end, obscurely angular, remotely tubercled in longitudinal rows, smooth in the other parts, red when ripe, one-celled, inflated, bursting irregularly, and dispersing the seeds, which are ovate and pale brown, with a spring. It is a native of India, flowering in June and July.

The second species has a round, slender, branched stem, climbing by lateral tendrils: the leaves are sinuate-palmate, wrinkled, smooth, toothed, spread out into a ring, having the nerves pubescent; they are alternate and petioled: the flowers are sometimes hermaphrodite, on long, axillary, one-flowered peduncles, of a yellow or orange colour: the fruit oblong, bluntly angular, tubercled, drawn to a point at each end, white, yellow, or green on the outside; within very red and fleshy, one-celled; it bursts elastically: the seeds ovate, flat, bitten at the edge. It is a native of the East Indies, flowering in June and July. It varies, according to some, with short pointed fruit.

The third has an angular, very much branched stem, climbing by bifid spiral tendrils: the leaves having five or seven sharp angles, the middle one double the length of the others, unequally serrate, veined, wrinkled, on long alternate petioles: the male flowers are several together, terminating: the females lateral, and solitary: the pome a foot long, two inches thick, roundish, usually drawn to a point at each end, hairy, three-celled, with a white, flaccid, esculent pulp, of an insipid flavour: the seeds are oblong, compressed, and smooth. It is a native of the East Indies, flowering in July and August.

The fourth species has a large fleshy perennial root, somewhat like that of Bryony: the stems thick, rough, trailing, dividing into many branches, and extending every way two or three feet: the leaves are thick, rough, almost heart-shaped, gray, on long foot-stalks: the flowers axillary, much less than those of the common Cucumber, of a pale yellow colour, with a greenish bottom: the male flowers stand on short thick peduncles; but the female flowers sit on the top of the young fruit, which grows to an inch and half in length, swelling like a Cucumber, of a gray colour like the leaves, and covered with short prickles: the fruit does not change its colour, but when ripe quits the peduncle, and casts out the seeds and juice with great violence. It is a native of the South of Europe.

When the fruit is designed for medicinal use, it should be gathered before it is ripe, otherwise the greatest part of the juice, which is the only valuable part, is lost, as the expressed juice is not to be compared with that which runs out of itself; and the elaterium made from the clear juice is whiter, and keeps much longer than that which is extracted by means of pressure. All the parts of the plant are bitter, and strongly purgative.

Culture.—All these plants may be increased by sowing the seeds in the first three sorts upon a moderate hot-bed in the early spring months, as about March; and when the plants have had a little growth, let them be pricked out into another hot-bed, fresh air being given in fine weather, and water occasionally; or they may be let remain in the first hot-bed till they have acquired sufficient growth, and have four or five leaves, when they should be removed into the hot-bed where they are to remain, one or two plants being put into each light, due shade and water being given till fresh rooted. They afterwards demand the same management as the Cucumber kind, the branches being suffered to extend themselves in the same manner. When thus managed and properly treated in respect to air and water, they produce fruit and ripe seeds in the latter end of summer, when it must be immediately gathered to prevent its being dispersed.

The plants may likewise be set in pots, and placed in the hot-house, their vines or stems being supported by sticks, in which mode they have a much better appearance and effect.

The fourth sort may be sown or suffered to scatter, where the plants are to remain, or on beds of fine mould in the autumn; the plants being afterwards thinned out or removed into rows in an open situation, three or four feet apart, and as many distant in them, requiring only the

further culture of being kept clean from weeds. When the soil is dry, they often continue three or four years.

All the sorts afford ornament, the first three sorts in the stove, and the last in the open borders. The fruit of the last also affords a medicinal substance by inspissation.

MONARDA, a genus containing plants of the fibrous-rooted herbaceous flowery biennial and perennial kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Verticillatae*.

The characters are: that the calyx is a one-leaved tubular perianthium, cylindric, striated, with a five-toothed equal mouth, permanent: the corolla unequal: tube cylindric, longer than the calyx: border ringent: upper lip straight, narrow, linear, entire; lower lip reflex, broader, trifid; middle segment longer, narrower, emarginate; lateral blunt: the stamina have two bristle-shaped filaments, the length of the upper lip, in which they are involved: anthers compressed, truncate at top, convex below, erect: the pistillum is a four-cleft germ: style filiform, involved with the stamens: stigma bifid, acute: there is no pericarpium: calyx containing the seeds at the bottom: the seeds four, roundish.

The species cultivated are: 1. *M. fistulosa*, Purple Monarda; 2. *M. oblongata*, Long-leaved Monarda; 3. *M. didyma*, Scarlet Monarda, or Oswego Tea; 4. *M. rugosa*, White Monarda; 5. *M. punctata*, Spotted Monarda.

The first has a perennial root, composed of many strong fibres, and spreading far on every side: the stems, near three feet high, are hairy and obtuse-angled; they send out two or four small side branches towards the top: the leaves oblong, broad at the base, but terminating in acute points, hairy, a little indented on their edges, on short hairy foot-stalks: the stem and branches terminating by heads of purple flowers, which have a long involucre, composed of five acute-pointed leaves. It is a native of Canada, flowering from June to August.

The second species differs from the first, in having the leaves ovate at the base, and a little attenuated, and more villose underneath. It is a native of North America, flowering from July to September.

The third has a perennial root: the stems about two feet high, smooth, acute-angled: the leaves indented on the edges, on very short foot-stalks; when bruised they emit a very grateful refreshing odour: towards the top of the plant come out two or four small side branches, with smaller leaves of the same shape: the flowers are

produced in large heads or whorls at the top of the stalk, and there is often a smaller whorl at a joint below the head; and out of the head arises a naked peduncle, sustaining a small head or whorl: the flowers are of a bright red colour. They come out in July; and in a moist season, or when the plants grow in a moist soil, they continue till the middle or end of September. It is a native of North America.

The fourth species resembles the following, but the leaves are longer, smooth, wrinkled a little like those of Sage, and the flowers white. It is a native of North America, flowering from July to September.

The fifth has stems about two feet high, branching out from the bottom to the top: the leaves lanceolate, coming out in clusters at each joint, where there are two larger leaves, and several smaller ones on each side; the larger leaves are two inches and a half long, three quarters of an inch broad, and slightly indented on their edges: towards the upper part of the stem the flowers come out in large whorls, with an involucre to each whorl composed of ten or twelve small lanceolate leaves, of a purplish red colour on their upper side (four larger, and four smaller, besides the leaves of the whorls): the flowers are pretty large, of a dirty yellow colour spotted with purple. It is a biennial plant; and a native of Maryland and Virginia, flowering here from June to October.

Culture.—All these plants may be increased by parting the roots, and some of them by slips and cuttings as well as seeds.

As the first sort does not increase fast by the roots, the seeds may be sown in the autumn on a bed of good earth, and in the following summer the plants be removed into nursery rows half a foot apart, in a rather shady situation, and in the beginning of the following autumn set out where they are to remain and flower. They succeed best in a soft loamy soil not too much exposed.

The roots should be divided either in the autumn or very early spring, but the former is the better, being afterwards either planted out in rows to remain till they are strong, or, when strong, at once where they are to remain.

Strong slips or cuttings of the branches may be taken off in the beginning of summer, and planted out in a shady border, due shade and water being given till well rooted, when in the autumn they may be removed to where they are to remain.

The third sort succeeds best in a light soil, in an eastern situation.

They all afford ornament in the borders and clumps of pleasure-grounds.

MONKEY-FLOWER. See *MIMULUS*.

MONKEY'S-BREAD. See *ADANSONIA*.

MONK'S-HOOD. See *ACONITUM*.

MONK'S-RHUBARB. See *RUMEX*.

MONSONIA, a genus containing plants of the herbaceous under-shrubby biennial and perennial kinds, for the green-house.

It belongs to the class and order *Monadelphia Dodecandria*, and ranks in the natural order of *Grinales*.

The characters are: that the calyx is a five-leaved perianthium: leaflets lanceolate, awned, equal, permanent: the corolla has five petals, obovate, præmorse-toothed, longer than the calyx, inserted into the base of the pitcher of stamens: the stamina have fifteen filaments, united in five bodies, three in each, all connected at the base, and forming a very short pitcher: anthers oblong: the pistillum is a five-cornered short germ: style awl-shaped: stigmas five, oblong: the pericarpium is a five-cornered capsule, five-celled: each cell fixed to a very long, twisted, terminating tail: the seeds solitary.

The species are: 1. *M. speciosa*, Fine-leaved Monsonia; 2. *M. lobata*, Broad-leaved Monsonia; 3. *M. ovata*, Undulated Monsonia.

The first has the radical leaves petioled, several, bipinnate-quinate: leaflets linear, pinnate, pinnasublanccolate: the scapes two or three, one-flowered, a span high, twice as long as the leaves, having in the middle a small six-leaved involucre, with lanceolate leaflets: the flower handsome: in habit and fructification it bears great affinity to Geranium, but is distinguished from it by having the appearance of Anemone, and by the stamens and style being different.

The second species is very like the preceding, differing in no respect from it, not even in the very singular crown of the germ; but the leaves are simple, bluntly seven-lobed, crenate, blunt, subpubescent (as the whole herb is), entirely resembling those of some sorts of Geranium: the fruit has a beak to it, with a very long point.

The third has the stem herbaceous, columnar, and filiform: the leaves opposite, about equal in length to the foot-stalks, ovate, crenated, about half an inch long, with some hairs: the stipules are two on each side, subulate: the flowers are axillary, on very long foot-stalks, of a whitish yellow colour; about the middle of the length of the foot-stalk are two stipules: the foot-stalk of the flowers is upright: when bearing the fruit it is declinate-erect from the stipules, one-flowered.

All these plants are natives of the Cape; the two first being perennial, flowering in April

and May, and the third biennial, flowering in August.

Culture.—The first sort rarely, if ever, ripening seeds in this climate, must be increased by cuttings of the root, which should be planted in pots of good mould, and plunged in a tan-hot-bed, watering them occasionally, when in a little time buds appear on the tops of the cuttings which are left out of the ground. They should be treated as hardy green-house plants, or be afterwards removed into separate pots, and sheltered under a good garden frame in the winter season.

And the second sort should be raised in the same manner.

But the third should be raised from seeds, which must be sown in the early spring in pots of light earth, and plunged in a mild hot-bed. When the plants are come up, they should be removed into other pots separately, and be managed as the other kinds.

They afford variety among other potted plants.

MOON TREFOIL. See *MEDICAGO*.

MORÆA, a genus furnishing plants of the bulbous-tuberous-rooted herbaceous flowering perennial kinds.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatiæ*.

The characters are: that the calyx has two-valved spathes: the corolla six-petalled: three inner parts spreading; the rest as in Iris: the stamina consist of three short filaments: anthers oblong: the pistillum is an inferior germ: style simple: stigmas three, bilid: the pericarpium is a three-cornered capsule, three-grooved, three-celled: the seeds very many, round.

The species cultivated are: 1. *M. Iriopetala*, Iris-petalled Moræa; 2. *M. Iridioides*, Iris-like Sword-shaped Moræa.

The first sort has two varieties, the first of which has the bulb with the scales connected at the sides a little compressed, but distinct at the base: with ten compressed teeth, and as many alternately shorter: the skin smooth, and dark-coloured: the culm branched: branches three or four: the leaves three or four, awl-shaped, pale-green, from five to seven or eight inches in length, and about half an inch broad, terminating with three angles; the glumes two-valved, subglobular, two-flowered: the flowers are white: the seeds of a reddish rust colour. It is a native of the Cape, flowering in June.

The second has the scales connected at the base, bilid, depressed, but not compressed: the glume two-valved, two-flowered: the flowers two, seldom more than two on a scape: the roots are fibrous, like those of the Hag-leaved

Iris, whence arise many small sword-shaped leaves, five or six inches long, and half an inch broad in the middle, diminishing towards both ends, of a deep green colour, lying over each other at the base: the scape about eight inches high, having one small leaf at each joint, and terminated by one flower, covered with a two-valved spathe, of a dirty white, with a blush of purple. It is a native of the Cape, flowering in June, and ripening seeds about the end of July.

The second species has a fibrous root; the scape a span or foot high, roundish or scarcely compressed, jointed, smooth, simple or little branched, upright, the length of the leaves: the leaves ensiform, narrowed at the inner base, nerved, smooth, acuminate, upright: the flowers from the uppermost axils of the leaves, sometimes three, but often only one: the spathe two-valved: the germ pedicelled, subtrigonal, striated: the corolla is six-petalled: the three outer petals obovate, oblong, bearded, spreading, with a yellow spot in the middle: the three inner white without spots, spreading like the outer ones: the seeds numerous, variously angular, depressed, with two flat sides. It is a native of the Cape.

Culture.—These plants are all increased either by seeds, offsets, or parting the roots, which should be performed in August, in all the methods; the seeds being sown in small pots, and plunged into a bed of old tanner's bark, under a common frame. The seed is chiefly sown for the sake of raising new varieties.

The plants also require the shelter of a frame in winter, being apt to draw up weak when placed in the dry stove. Where they can enjoy the free air in winter, when the weather is mild, and be secured from frost and hard rain, they flower and ripen their seeds better than with more tender management. In summer they should be fully exposed to the open air till the approach of autumn, when they should be removed into the shelter of the frame.

They afford variety among other potted plants in the green-house, &c.

MORINA, a genus furnishing plants of the hardy herbaceous flowery perennial kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is double: the perianthium of the fruit inferior, one-leaved, cylindric, tubular, permanent: mouth toothed: toothlets two, opposite, longer; all subulate, acute: perianthium of the flower superior, one-leaved, tubular, bifid; segments emarginate, blunt, permanent, upright, the size of the outer: the corolla one-petalled, two-lipped: tube very

VOL. II.

long, widening above, a little curved in, filiform at bottom: border flat, blunt, upper lip semi-bifid, smaller; lower trifid; segments all blunt, uniform, the middle one more lengthened: the stamina have two bristle-shaped filaments, approximating to the style, parallel, shorter than the border: anthers erect, cordate, distant: the pistillum is a globular germ, under the receptacle of the flower: style longer than the stamens, filiform: stigma headed-peltate, bent in: there is no pericarpium: the seed single, roundish, crowned with the calyx of the flower.

The species is *M. Persica*, The Persian or Oriental Morina.

It has a taper and thick root, running deep into the ground, sending out several thick strong fibres as large as a finger: the stem nearly three feet high, smooth, purplish towards the bottom, but hairy and green at the top: at each joint are three or four prickly leaves, four or five inches long, an inch and half broad, of a lucid green on the upper side, but of a pale green and a little hairy underneath, armed on their edges with spines; the flowers axillary on each side, some white and others purplish red on the same plant; appearing in July, but do not produce seed in this climate. According to some it has the odour of Honeysuckle. It is a native of Persia near Ispahan.

Culture.—This is increased by seed or off-sets from the roots.

The seeds should be sown in the autumn in the places where the plants are to grow, as, from their having a strong tap-root, they do not bear shifting well. The ground in the bed or border near them should not be afterwards much disturbed, the plants being only kept clean. They mostly flower in two or three years after being raised.

The off-sets should be slipped from the roots while young, and be planted out where they are to stand, in the latter end of the summer, being afterwards treated as those raised from seed.

They decay to the ground in the autumn, new leaves being sent up in the spring; but the roots continue several years when not stirred, or injured by severe frosts.

They are highly ornamental in the principal beds and borders of pleasure-grounds.

MOROCCO, RED. See *ADONIS*.

MORUS, a genus containing plants of the deciduous tree kind.

It belongs to the class and order *Monocelia Tetrandria*, and ranks in the natural order of *Scabridæ*.

The characters are: that the male flowers are in an ament: the calyx is a four-parted perianthium: leaflets ovate, concave: there is no corolla: the stamina have four awl-shaped fila-

S.

ments, erect, longer than the calyx, one within each calycine leaf: anthers simple: female flowers heaped either on the same, or a different individual from the males: the calyx a four-leaved perianthium: leaflets roundish, blunt, permanent, the two opposite outer ones incumbent: there is no corolla: the pistillum is a cordate germ: styles two, awl-shaped, long, reflex, rugged: stigmas simple: there is no pericarpium: calyx very large, fleshy, become succulent, like a berry: the seed single, ovate, acute.

The species cultivated are: 1. *M. nigra*, Common Mulberry Tree: 2. *M. alba*, White Mulberry Tree: 3. *M. papyrifera*, Paper Mulberry Tree: 4. *M. rubra*, Red Mulberry Tree: 5. *M. indica*, Indian Mulberry: 6. *M. tinctoria*, Dyer's Mulberry or Fustick-wood.

The first differs from the second sort, according to Linnæus, in having the leaves subquincquelobate, bluntish, and rugged, undivided and shining; the fructification of the second dioecious, of this monœcious. These distinctions are not however exact, as this is a larger, stronger tree; and the fruit is dark blackish red and more acid. According to Miller, it has generally male flowers or catkins on the same tree with the fruit, but it often happens that some of the trees which are raised from seeds have mostly male flowers and produce no fruit; and he has observed some trees which produced only catkins for many years after they were planted, and afterwards have become fruitful. "This," Martyn says, "agrees with a general remark that he has made on monœcious trees, that whilst they are young they bear male flowers chiefly and very little fruit." Trees of this sort of a certain age are not only more fruitful than young ones, but their fruit is much larger and better flavoured. It grows naturally in Persia; whence introduced into Europe.

This is the sort usually cultivated as a fruit-tree in the garden.

There is a variety with palmate or elegantly cut leaves and a smaller fruit.

The second species is a middle-sized tree, with a whitish bark, of which a coarse sort of paper may be made, and spreading branches: the leaves are broad-lanceolate, obliquely cordate, subserrate, undivided, or three-lobed, some cut, smooth, petioled, scattered: the berries lateral, juicy, insipid, pale, oblong. It is a native of China, &c. flowering in June.

Miller observes that there are two or three varieties of this tree, which differ in the shape of their leaves, and in the size and colour of the fruit; but as it is of no other use but for the leaves, the strongest-shooting and the largest-leaved should be preferred.

This sort is commonly cultivated for its leaves to feed silk-worms in France, Italy, &c.; and in Spain, according to Mr. Townsend, they prefer the White Mulberry in Valencia, and the Black in Granada. But the Persians generally make use of the latter; and Mr. Miller was assured by a gentleman who had made trial of both sorts of leaves, that the worms fed with the latter produced much the best silk; but that the leaves of the black should never be given to the worms after they have eaten for some time of the white, lest they should burst. And Sir George Staunton states, that the tender leaves growing on the young shoots of the black sort are supposed in China to be the most succulent or juicy.

The third is a tree which makes very strong vigorous shoots, but seems not to be of tall growth, as it sends out many lateral branches from the root upwards. The leaves are large, some of them entire, others deeply cut into three or five lobes, especially whilst the trees are young; they are dark green and rough to the touch on the upper surface, but pale green and somewhat hairy on the under side, falling off on the first approach of frost in autumn. The fruit is little larger than peas, surrounded with long purple hairs, when ripe changing to a black-purple colour, and full of sweet juice. It is a native of Japan and the South Sea islands.

The fourth species, which is the Virginian Red or Large-leaved Mulberry Tree with black shoots, grows to the height of thirty or forty feet in its native situation, sending forth many large branches. The leaves are not only larger but rougher than those of the common Mulberry, though in other respects they somewhat resemble them. It produces plenty of catkins, in shape like those of the Birch, and it has a dark reddish fruit. It is a native of Virginia and Carolina.

The fifth is a large tree, with a soft, thick, yellowish bark, and a milky juice like the Fig, which is astringent. The branches come out on every side. The leaves are on short footstalks, rough, dark green above, pale underneath, alternate. The flowers in round heads, at the footstalks of the leaves, on each side the branches, of an herbaceous white colour: the fruit roundish, first green, then white, and finally dark red. According to Miller it is a monœcious tree, but Linnæus suspects it to be dioecious. It is a native of the East Indies.

The sixth species is a tall branching tree with a fine head, the whole abounding in a slightly glutinous milk of a sulphureous colour: the timber is yellow, and is used in dyeing: the spines awl-shaped, solitary, few; entire branches are frequently without any: the leaves acuminate, serrate, smooth on both sides, veined, distichous,

on short petioles of various sizes : aments solitary, pendulous, axillary between the petiole and the spine, two or three inches in length, cylindrical and very close : the female flowers on a different tree, collected into a globe : their receptacles axillary, glaucous-green, solitary, with short petioles : among the female flowers are some chaffy bodies, which perhaps were flowers suffocated by their neighbours and dried up : the fruit yellowish green, sweet, but eaten chiefly by birds. It is a native of Brazil.

Culture.—All the sorts are capable of being increased by seeds, layers, cuttings, grafting, and inoculating or budding.

The seed method is chiefly practised for those which are not intended as fruit-trees, as they are very liable to vary in that way. It should be sown in the early spring, as about March, on a bed of fine earth, in a warm aspect, or upon a moderate hot-bed protected with glasses, in drills to the depth of a quarter of an inch. Water should be given slightly in dry weather ; and in the heat of the day shade ; covering it in cold nights. When the plants appear, they should be well guarded from frost in the early spring, and be kept clean during the summer, and properly shaded and watered, protecting them the first autumn and winter, removing them in the following March into nursery rows two feet apart, and one distant, to continue a few years, when they may be set out where they are to grow. They should not be removed, either from the seed-bed or nursery rows, till perfectly strong.

When intended for feeding silk-worms, they should be kept in a low shrubby state.

They appear, from Sir George Staunton, to succeed best in China, on beds about a foot high in moist loamy soils.

When raised for fruit, great care should be taken that the layers or cuttings be not only taken from old fruit-bearing trees, but that the branches made use of be also fruit-bearing.

The layers may be made from stools formed for the purpose, or by raising large boxes, baskets, or pots of earth, so as to lay the branches in them in the autumn, by the slit method, heading them down to two eyes each. When they have taken root in the autumn following, they may be removed into the nursery and managed as the seedlings.

The cuttings should be made from the former year's shoots of such trees and branches as bear well, and have fine fruit, not being shortened, but planted their whole length, leaving two or three buds above the ground. They should be planted in March on light rich earth, pressing the mould well about them, in order that it may be kept from getting too dry.

When well rooted in the following spring, they may be removed into the nursery, being regularly trained to stems by means of stakes fixed to each of them, to which the principal shoots should be trained, removing most of the rest, except such as are necessary to detain the sap for the support of the stem.

They may be trained to Standards, Half Standards, and Dwarf Standards. See PRUNING and TRAINING.

After standing three or four years in the nursery, they will be ready to plant out for good.

They should have but little sun at the first planting of the cuttings, but afterwards as much as possible, provided the earth about them be prevented from becoming dry, by moss or other means. The cuttings also succeed well when planted in a hot-bed ; and in all cases when covered by hand glasses.

Some also plant them in October.

The grafting and budding, or inoculating, are certain methods of continuing the proper kinds, and should be practised in the usual manner upon the seedling stocks of any of the species. See GRAFTING and BUDDING.

Mr. Forsyth remarks, that "as the fruit is produced on the young wood, only such branches as cross others, and such as are decayed, or broken by accident, should be cut out, applying at the same time the composition. When, however, the heads become too full of wood, it will, he thinks, be necessary to thin them, as the fruit is larger and better flavoured where the heads are kept thin of wood."

He advises planting these trees, when for fruit, in grass orchards and pleasure-grounds, as "the finest of the fruit, when ripe, frequently drops, which, if it fall on dug or ploughed ground, will be soiled and rendered unfit for use, as the earth will adhere so to the fruit as to render the cleaning of it impracticable ; but if planted on lawns, or in grass orchards, the fruit can be picked up without receiving any injury. Another reason for planting these trees on lawns or in orchards is," he says, "that when full grown, they are too large for a kitchen-garden. The soil in which they thrive best is a rich, light, and deep earth."

"He has tried the efficacy of his composition on several of these trees in a very decayed hollow state of the trunk, cutting out all the dead wood and cankered parts of some, and heading down others that were stunted and sickly. After these operations they put forth vigorous branches, and bore excellent crops of fruit, more than double the size of that which they produced in their former state."

And he advises "those who have any old

decayed Mulberry-trees, to treat them in the same manner; but those which are very much decayed should be headed down; this will throw them into a healthy bearing state, and in two or three years they will, he asserts, produce plenty of fine fruit."

And as old trees of this sort bear better and have finer fruit than young ones, it is of importance, he thinks, to restore them.

The fifth and sixth sorts are tender, requiring the protection of the bark stove.

The first sort is raised for the fruit; but the others chiefly for the purpose of variety and ornament. The third is used for having the bark made into paper in some countries.

MOSSING OF FRUIT-TREES. This is a disease arising from the Moss Plant establishing itself upon such fruit-trees as are in an unhealthy state of growth or which are planted so close together as to prevent a due circulation of air and dryness. The trees, by this means, are not only injured, from the plant fixing itself upon them, and restricting their growth, but probably by the quantity of moisture that it attracts, and the dampness that is produced in that way.

For the prevention and removal of this state of fruit-trees, Mr. Forsyth advises the washing them with a mixture of fresh cow-dung, urine and soap-suds, as by this means the moss is not only prevented from growing on the trunks and branches, but the ova of insects are destroyed, the trees nourished, and the bark kept in a fine healthy state. It may also be removed by scraping the trees.

Apple-, Pear-, and Plum-trees are very liable to be affected in this way.

MOTION OF PLANTS, the course or direction of growth in different parts of them.

In the roots and stems the direction is totally opposite, the former either running directly downward into the ground, or horizontally under the surface; while the latter direct their motion towards the air and light of the sun, mostly in an upright manner, but sometimes horizontally along the surface of the ground. The causes which operate in promoting these are the quest of nourishment in the root, and the influence of the air and light of the sun on the stem; for when any number of plants growing in pots is placed in a room, which only admits a small portion of light at one place, the stems all incline towards that side; in close dark thickets, the young trees always lean to the part where the most light penetrates; and the new shoots of espalier or wall-trees detach themselves from those supports, in quest of free air and light.

It seems that the force of motion is greater in

the roots than in the stems; the roots, without ever once going out of their way, pierce the hardest soils, penetrate into walls, which they overturn, and even into rocks, which they split; whereas the stems and branches surmount obstacles by leaving their natural direction, and over-topping them.

Though the natural tendency of most stems or trunks is to ascend, some by their weakness, or natural growth, descend: and occasionally by means of roots breaking out all along the stems and branches, as in the Strawberry, Penny-royal, and many other creeping plants, the stems are, by the roots striking into the earth, tethered as it were to the ground, and only their extremities have the power of directing their course upwards.

The leaves and flowers of plants also direct their course towards the air, and light of the sun; the leaves always turning their upper surface outward to the air and light; which is very obvious in Wall-trees, and when a branch is overturned, so that the leaves are inverted, they naturally direct their surfaces again gradually upwards to the light and air, though this often takes them several days' growth. Some flowers are also supposed to have a particular daily motion, so as to present their surfaces directly to the sun, and follow the diurnal course of it, as the Sun-flower, and most of the compound flowers; in all of which the disk or surface is believed to look towards the east in the morning, the south at noon, and the west in the evening.

And during the heat of the sun, the pinnated or winged leaves, particularly of the papilionaceous tribe of plants, rise vertically upward; the opposite lobes or folioles, which compose these leaves, rise so as to be generally applied close together by their upper surfaces; but in that state of the atmosphere which generally precedes a storm, or during a close, moist, cloudy air, the lobes of the same sort of leaves extend themselves commonly along the foot-stalk; and after sun-set incline still lower, and hang directly down under the foot-stalk, being applied close together like the leaves of a book, by their lower surfaces; a state which by Linnæus is called the sleep of plants.

The simple leaves of many plants, when their surface is exposed to an ardent sun, also become concave above, but gradually recover as the heat declines. But, of all the motions of the leaves of plants, none is so sudden and rapid as those of the Sensitive and Humble kinds.

There is another kind of motion in plants; that is, elasticity; which is resident particularly in some sorts of seed-vessels, such as the Yellow Balsamine, and Spurting Cucumber, &c. in which their fruits, when arrived at maturity,

burst open like a spring, and dart out their seeds with an elastic force to a considerable distance in many cases.

MOULD, such earthy substances as constitute soils, when reduced into a fine pulverized state in their particles. It is of different qualities according to the nature of the earth or soil in which it is found. But the best is probably that which contains a large proportion of carbonaceous or vegetable matter. It is of very different colours in different cases, as hazel, dark-gray, russet, ash, yellowish red, and various others. But the first three colours are generally considered as denoting the best qualities, and the last the most unfriendly for the growth of vegetables.

For the purpose of the gardener, those moulds which are capable of working well at all seasons, are rather light and dry, perfectly mellow and fine in their particles, being well enriched with vegetable and animal matters, are the most proper and capable of affording the largest crops of good vegetables. See **EARTH** and **SOIL**.

MULCH, a term made use of in gardening to signify such strawy dung as is somewhat moist and not rotted. It is found useful for protecting the roots of new-planted choice trees or shrubs from severe frost in winter, and from being dried by the fierce sun or drying winds in spring and summer, before they are well rooted; in which cases it is spread evenly on the surface of the ground round the stems of the trees, as far as the roots extend, about three or four inches thick, but which should be augmented in winter, when the severity of the frost renders it necessary. It may also be employed for many other purposes.

MOUNTAIN ASH. See **SORBUS**.

MOUSE-EAR. See **HIERACIUM**.

MUGWORT. See **ARTEMISIA**.

MULBERRY-TREE. See **MORUS**.

MUSA, a genus containing plants of the perennial kind for the hot-house.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Scitamineae*.

The characters are: that the hermaphrodite flowers are more towards the base of the simple spadix, separate in alternate spathes: the calyx is a partial, ovate-oblong spathe, plano-concave, large, many-flowered: the corolla unequal, ringed: the petal constituting the upper lip, but the nectary the under lip: petal erect, ligulate, truncate, five-toothed, converging in front at the base: nectary one-leafed, cordate, boat-shaped, compressed, acuminate, spreading outwards, shorter than the petal, inserted within the sinus of the petal: the stamina have six

awl-shaped filaments, five of which within the petal are erect, the sixth within the nectary is reclining: anthers linear, from the middle to the top fastened to the filament; but most frequently there is only one anther on the sixth filament, and very small ones or none on the rest: the pistillum is a very large germ, obtusely three-sided, very long, inferior: style cylindric, erect, the length of the petal: stigma headed, roundish, obscurely six-cleft: the pericarpium is a fleshy berry, covered with a husk, obscurely three-sided, or six-sided, gibbous on one side, one-celled, hollow in the middle: the seeds very many, nestling, subglobular, wrinkled-tubercled, excavated at the base, or only rudiments: males on the same spadix, above the hermaphrodite flowers, separated by spathes: the calyx, corolla, and nectary as in the hermaphrodite: the stamina have filaments as in the hermaphrodites, equal, erect: anthers as in hermaphrodites, on the filament placed within the nectary, most frequently very small or none: the pistillum is a germ as in the hermaphrodites, but less: style and stigma as in them, but less and more obscure: the pericarpium is abortive.

The species cultivated are: 1. *M. paradisiaca*, Plantain Tree: 2. *M. sapientum*, Banana Tree.

The first rises with a soft herbaceous stalk, fifteen or twenty feet high, and upwards, in its native situation: the lower part of the stalk is often as large as a man's thigh, diminishing gradually to the top, where the leaves come out on every side, which are often more than six feet long and near two feet broad, with a strong fleshy midrib, and a great number of transverse veins running from the midrib to the borders: the leaves are thin and tender, so that where they are exposed to the open air they are generally torn by the wind; for, as they are large, the wind has great power over them: these leaves come out from the side of the principal stalk, inclosing it with their base; they are rolled up at their first appearance, but when they are advanced above the stalk they expand quite flat, and turn backward: as these leaves come up rolled in the manner before mentioned, their advance upward is so quick, that their growth may be almost discerned by the naked eye; and if a line is drawn across, level with the top of the leaf, in an hour's time the leaf will be near an inch above it: when the plant is grown to its full height, the spike of flowers will appear from the centre of the leaves, which is often near four feet in length, and nods on one side: the flowers come out in bunches, those on the lower part of the spike being the largest; the others diminish in their size upward; each of these bunches is covered with a spathe or sheath, of a fine purple colour

within, which drops off when the flowers open : the upper part of the spike is made up of male or barren flowers, which are not succeeded by fruit : the fruit is eight or nine inches long, and above an inch diameter, a little incurved, and has three angles ; it is at first green, but, when ripe, of a pale yellow colour, having a tough skin, within which is a soft pulp of a luscious sweet flavour : the spikes of fruit are so large as to weigh upwards of forty pounds in some cases. It is a native of the East Indies, flowering from October to November.

The second species, or Banana Tree, differs from the preceding in having its stalks marked with dark purple stripes and spots : the fruit is shorter and rounder, with a softer pulp of a more luscious taste : but Mr. Dampier says, it is less luscious, though of a more delicate taste. And according to Long, it has a softer, mellow taste, and is more proper for fritters than the Plantain. A very excellent drink is made from the juice of the ripe fruit fermented, resembling the best Southam cyder. It is found in the West Indies.

There are several varieties of each species.

It is observed by Brown, that "these two fruits are among the greatest blessings bestowed by Providence upon the inhabitants of hot climates." And that "three dozen Plantains are sufficient to serve one man for a week instead of bread, and will support him much better."

Culture.—These plants may be increased by planting the young suckers of the roots of such plants as have fruited, taken off carefully with root-fibres, in large pots filled with light rich earth, and plunged in the tan-bed of the stove, in the summer season.

They afterwards require to have water given pretty plentifully in the hot summer months, but more sparingly in the winter, and in less proportions at a time. They succeed best in about the same degrees of heat as the Pine Apple. They should have the pots increased in size as they advance in growth.

But the best way to have them fruit well in this climate is to shake them out of the pots, after they have become fully established, with the balls of earth about their roots, and plant them in the tan-bed in the stove, old tan being laid round them for their root-fibres to strike into.

When new tan is added, care should be taken not to disturb their roots, and always to leave plenty of old tan about them, to guard against too much heat. They should have water twice a week in winter, about two quarts each plant at a time, and in summer twice as much at a time and every other day. The signs of per-

fecting their fruit, are their pushing out their flower-stems in the spring. The stoves should be sufficiently high for this purpose, as twenty feet or more.

In their native country, these trees thrive best where the soil is rich, cool, and moist. Their fruiting in the South Sea islands is said to be promoted by the use of lime and wood-ashes.

They are mostly cultivated here by way of curiosity and for variety.

MUSHROOM. See AGARICUS.

MUSTARD. See SINAPIS.

MYRICA, a genus furnishing plants of the deciduous and evergreen shrubby kinds.

It belongs to the class and order *Dioecia Tetrandria*, and ranks in the natural order of *Amentaceæ*.

The characters are : that in the male the calyx is an ovate-oblong ament, imbricate on all sides, loose, composed of one-flowered, crescent-shaped, bluntly acuminate, concave scales : perianthium proper none : there is no corolla : the stamens have four filaments (seldom six) filiform, short, erect : anthers large, twin, with bifid lobes : female—the calyx as in the male : there is no corolla : the pistillum is a subovate germ : styles two, filiform, longer than the calyx : stigmas simple : the pericarpium is a one-celled berry : the seed single.

The species cultivated are : 1. *M. Gale*, Sweet Gale, Sweet Willow, or Candle-Berry Myrtle ; 2. *M. cerifera*, American Candle-Berry Myrtle ; 3. *M. quercifolia*, Oak-leaved Candle-Berry Myrtle ; 4. *M. cordifolia*, Heart-leaved Candle-Berry Myrtle.

The first rises with many shrubby stalks, from two to near four feet high, dividing into several slender branches, and is covered with a dusky or rust-coloured bark, sprinkled with white dots : the buds are composed of nine leafy shining scales, the first nearly opposite, very short, rectangularly pointed, the rest ovate, and blunt : the leaves are alternate, stiff, an inch and half long, and half an inch broad in the middle, light or yellowish green, smooth, a little serrate towards their points, and emitting a fragrant odour when bruised ; which is occasioned by the resinous points with which they are sprinkled : they are convoluted and petioled : the flowers appear before the leaves ; and the flower-buds are above the leaf-buds, at the ends of the branches, whence as soon as the fructification is completed the end of the branch dies, the leaf-buds which are on the sides shoot out, and the stems become compound : the aments or catkins are of a short ovate figure, of a yellowish brown colour, and frequently sprinkled with shining resinous golden

particles : the fruit is a coriaceous berry : the male and female aments are sometimes on distinct plants, and sometimes on the same individual. It is a native of the northern parts of Europe.

It is said, that "the northern nations formerly used this plant instead of Hops," and that "it is still in use for that purpose in some of the Western Isles, and a few places of the Highlands of Scotland."

It is here known by the names of *Sweet Gale*, *Goule*, *Gule*, *Sweet Willow*, *Wild Myrtle*, and *Dutch Myrtle*.

The second species is a shrub, or a tree acquiring a height of thirty feet in its native state : the bark is warted : the branches unequal and straight : the leaves evergreen, somewhat clustered, blunt at the end, membranaceous-rigid, wrinkled, smooth, covered underneath with very minute, shining, orange-coloured, glandular pores : the flowers are in aments, on different individuals : the male aments, according to Miller, are about an inch long, and stand erect : and Martyn says, the female aments are sessile, axillary, linear, shorter than the leaves : scales very minute, and between each of them an oblong minute germ, longer than the scales : two filiform styles, the length of the germ ; and reflex stigmas : the berry minute, roundish, yellow. It is a native of America.

The third has the stalks slender, shrubby, about four feet high, dividing into smaller branches : the leaves are about an inch and half long, and almost an inch broad, some of them having two, others three deep opposite indentures on their sides ; they sit close to the branches, and end in obtuse indented points : between the leaves come out some oval catkins, which drop off : it retains its leaves all the year, and is a native of the Cape, flowering in June and July.

The fourth species has a weak shrubby stalk, five or six feet high, sending out many long slender branches, closely garnished their whole length with small heart-shaped leaves, sitting close to the branches, slightly indented and waved on their edges : the flowers come out between the leaves in roundish bunches : they have an uncertain number of stamens, and are all included in one common scaly involucre or cover. The leaves continue all the year green. It is also a native of the Cape.

Culture.—The first two sorts may be raised from seed, and the two last by layers. The first kind requires a boggy moist situation, or to be cultivated on bog earth in such circumstances.

The seeds should be procured from their native situation, and sown in pots of rich earth, in the

spring, to the depth of half an inch, watering and shading them during the following summer, and on the approach of winter placed in a warm sheltered situation, or under a common frame. When the plants have attained some growth, they should be planted out in the spring in nursery rows, to remain till of proper size to be planted out in the pleasure-ground, where they succeed best in a soil that is not too dry.

The two last sorts are mostly raised by laying down the young shoots in the latter end of summer or in the autumn, twining them at a joint, and watering them well during the following summer, when the season is dry ; and when they have formed good roots, which is seldom the case till the second year, they should be taken off and planted in small pots filled with soft loamy earth, being placed under glasses in a common frame, and shaded from the mid-day sun till fully rooted ; when they may be removed into a warm sheltered place during the summer, and in the autumn removed into the green-house, being afterwards managed as other plants of that kind.

The first sorts are likewise sometimes raised by planting the suckers of the roots in nursery-rows as above in the autumn ; and all the sorts occasionally by cuttings, though they strike root with great difficulty. In this last way the young shoots are the most proper, which should be planted in pots, and plunged in a hot-bed, covering them close with glasses.

They are introduced, the two first in sheltered clumps and borders, and the latter sorts in collections of the green-house kind, where they afford a fine fragrance in their leaves.

MYRSINE, a genus comprising a plant of the evergreen exotic shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are : that the calyx is a five-parted perianthium, small : leaflets subovate, permanent : the corolla one-petalled, half-five-cleft : segments half-ovate, converging, blunt : the stamina have five filaments, scarcely visible, inserted into the middle of the corolla : anthers awl-shaped, erect, shorter than the corolla : the pistillum is a subglobular germ, almost filling the corolla : style cylindric, longer than the corolla, permanent : stigma large, woolly, hanging on the outside of the flower : the pericarpium is a roundish berry, depressed, one-celled : the seed one, subglobular, fixed obliquely to the bottom of the berry.

The species cultivated is *M. Africana*, African Myrsine.

It has the flowers axillary, in threes, on short

peduncles: the corolla is pale, rugged with testaceous dots; ciliate, closed: the stamens opposite to, not alternate with, the segments of the corolla: the stigma is pencil-shaped: the berry of the same form and shape with that of *Uva Ursi*, and blue: the nucleus of the same shape, globular, depressed a little. It is a native of the Cape, flowering from March to May.

Culture.—This plant may be increased by sowing the seeds in spring on a hot-bed; and when the plants are fit to transplant, planting them out singly into small pots of good mould, due shade and water being given, and in the autumn they may be removed into the green-house for protection in winter.

They may also be raised by planting cuttings of the young shoots in pots in summer, due shade and water being given. They afterwards require the management of other green-house plants.

They afford variety among collections of this sort of plants.

MYRTLE. See MYRTUS.

MYRTLE, CANDLEBERRY. See MYRICA.

MYRTLE-LEAVED SUMACH. See CO-

RIARIA.

MYRTO-CISTUS. See HYPERICUM.

MYRTUS, a genus furnishing plants of the evergreen shrubby kind for the green-house and stove.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Hesperideae*.

The characters are: that the calyx is a one-leaved perianthium, four- or five-cleft, bluntish, superior, raised internally into a subvillose ring, permanent: the corolla has four or five petals, ovate, entire, large, inserted into the calyx: the stamina have very many capillary filaments, the length of the corolla, inserted into the calycine ring: anthers roundish, small: the pistillum is an inferior germ, two-celled or three-celled; the seeds fixed to the partition: style simple, filiform: stigma blunt: the pericarpium is an oval berry, umbilicated with the calyx, one-, two-, or three-celled: the seeds few, kidney-form.

The species cultivated are: 1. *M. communis*, Common Myrtle; 2. *M. tomentosa*, Woolly-leaved Myrtle; 3. *M. biflora*, Two-flowered Myrtle; 4. *M. lucida*, Shining Myrtle; 5. *M. dioica*, Dioecious American Myrtle; 6. *M. Zeylanica*, Ceylon Myrtle; 7. *M. acris*, Cut-leaved Myrtle; 8. *M. coriacea*, Sumach-leaved Myrtle; 9. *M. Pimenta*, Pimento, Jamaica Pepper, or Allspice.

The first is well known as an elegant evergreen shrub, but just too tender to abide the winter without some protection in this climate, except in the most southern and western parts:

the trunk is irregular, branching, covered with a brown rough scaling bark: the leaves ovate or ovate-lanceolate, entire, smooth on both sides, dark-green, paler underneath, opposite and decussated: the flowers come out singly from the axils, and have a two-leaved involucre under them. It is a native of Asia and the southern parts of Europe, flowering in July and August.

There are several varieties, the principal of which are:

The Common Broad-leaved or Roman Myrtle, which grows to the height of eight or ten feet in this climate, but much higher in Italy, where it is the principal underwood of some of the forests: the leaves are broader than most of the other varieties, being an inch in breadth; they are an inch and half long, of a lucid green, ending in acute points, and are sessile or on very short foot-stalks: the flowers are larger than those of the other varieties, on pretty long slender peduncles, from two to four at the same axil: the berries ovate, and of a dark purple colour. It is termed by some the *Flowering Myrtle*, because it flowers more freely here than the others, and *Roman Myrtle*, because it abounds about Rome.

The Box-leaved Myrtle, which has the leaves oval, small, sessile, of a lucid green, and ending in obtuse points; the branches weak, and frequently hanging down when permitted to grow without shortening; the bark is grayish: the flowers are small, and come late in the summer: the berries small and round.

The Common Italian Myrtle, which has ovate-lanceolate leaves ending in acute points; the branches grow more erect than in either of the preceding, as also the leaves, whence it is called by the gardeners *Upright Myrtle*. The flowers are not large, and the petals are marked with purple at their points, whilst they remain closed: the berries are small, oval, and of a purple colour.

There is a subvariety of this with white berries: and the *Nutmeg Myrtle* seems, according to Miller, to be only a subvariety of it.

The Orange-leaved, or what is sometimes termed Bay-leaved Myrtle, which has a stronger stalk and branches, and rises to a greater height: the leaves are ovate-lanceolate, in clusters round the branches, and of a dark green: the flowers are of a middling size, and come out sparingly from between the leaves: the berries are oval, and smaller than those of the first variety, but it is not so hardy as that.

The Portugal Myrtle, which has the leaves much smaller than those of the next, being less than an inch long, and not more than half an inch broad, lanceolate-ovate acute, of a dull green, set pretty close on the branches: the

flowers are smaller, and the berries small and oval.

The Broad-leaved Dutch Myrtle, which has leaves much less than those of the common sort, and more pointed, standing close together on the branches: the midrib on the under side of the leaves is of a purple colour: they are of a darker green, and sit closer to the branches: the flowers are smaller, on shorter peduncles, and come out a little later than those of the common sort.

The Double-flowering Myrtle, which is probably a sub-variety of this; the leaves and growth of the plant, the size of the flowers, and the time of the flowering, agreeing better with this than any of the others.

The Rosemary-leaved or Thyme-leaved Myrtle, which has the branches growing pretty erect; the leaves small, narrow, acute, sessile, and of a lucid green: the flowers are small, appearing late in the season. These varieties are constant; but there are others which are propagated in gardens and nurseries for sale, which are less considerable and more variable, as; the Gold-striped Broad-leaved Myrtle; the Broad leaved Jew's Myrtle, having frequently the leaves in threes; the Gold-striped Orange-leaved Myrtle; the Silver-striped Italian Myrtle; the Striped Box-leaved Myrtle; the Silver-striped Rosemary-leaved Myrtle; the Silver-striped Nutmeg Myrtle; and the Cock's-comb or Bird's-nest Myrtle.

The second species has the branches round, tomentose: the leaves are an inch and half long, elliptic, blunt, above dark and veined, reflex at the edge, the nerves more conspicuous underneath, smooth above, hoary underneath, on very short petioles: the peduncles axillary and terminating, solitary, opposite, tomentose: bractes two, small, oblong, at the base of the calyx, which is turbinate and tomentose, with four rounded segments: the petals oblong, tomentose-hairy without, purple within. It is a native of China, flowering in June and July.

The third rises with a divided trunk to the height of eight or ten feet, sending out many opposite branches covered with a gray bark: the leaves are shorter and rounder at the points, smoother and of a firmer texture than in the ninth sort: the flowers come out from the side of the branches between the leaves, on slender foot-stalks, about an inch in length, two generally from the same point: the berries are round, and brighter than in the ninth: but the leaves and fruit not being aromatic are not in use.

As it retains its leaves, which are of a splendid green, all the year, it makes a good appearance; but the flowers, being small and growing thinly upon the branches, do not make any great figure. It is a native of Jamaica.

VOL. II.

The fourth species has the leaves of a singular structure, being from ovate remarkably attenuated into a lanceolate top: the flowers are five-petalled. It is a native of Surinam.

The fifth has thick leaves: peduncles axillary and terminating, brachiate-panicled, length of the leaves: petals few. Native of America.

The sixth species has a strong upright stalk, covered with a smooth gray bark, dividing towards the top into many slender stiff branches: the leaves are near two inches long, and an inch and quarter broad, of a lucid green, and on very short foot-stalks: the flowers come out at the ends of the branches, several on one common peduncle, which branches out; and each flower stands on a very slender pedicel: they are very like the flowers of the Italian Myrtle. It is a native of Ceylon.

The seventh sort may contend the palm of elegance with most trees. It grows slowly, and flowers late, twice in a year. By age it acquires thickness and height beyond the mediocrity: the trunk is handsome, straight, forming a very lofty thick beautiful pyramidal head: the bark in the younger trees is brown, then ash-coloured, finally white entirely, or with large yellow spots; it is very smooth and even, especially in old trees, but here and there hangs down in slender shreds; the flavour is astringent, not without something of aromatic: the timber very hard, red, compact, ponderous, and capable of being polished; used for the cogs of wheels in the sugar-mills, and other works where considerable friction is required: the younger branches are acutely four-cornered and green: the leaves numerous, quite entire, shining, bright green, with transverse veins, blunt, attenuated into a short petiole; they are always opposite, commonly three or four inches long, of a very sweet aromatic smell, and on account of their agreeable astringency are used for sauce with food: the flowers small, white with a slight tinge of redness: the berries round, the size of peas, crowned with the remains of the calyx, having an aromatic smell and taste, which render them agreeable for culinary purposes. It is a native of the West Indies, where it is sometimes called *Bois d'Inde*.

The eighth species has the whole of the plant smooth: the leaves petioled, an inch long, emarginate, from a reflex margin becoming convex, the upper surface shining very much, veinless, transversely but obliquely marked with dusky nerved lines; the under surface less shining: the younger leaves veined on both sides, with minute raised dots scattered over the under surface, which vanish in the older leaves, and they have dusky spots impressed on the upper

T

surface: the peduncles are purplish, twice as long as the leaves, subracemose, in pairs: the pedicels opposite, commonly four, very remote, three-flowered: the flowers are pedicelled: the calyx is purplish, with roundish segments: the petals oblong, small: the fruit globular, the size of a pepper-corn. It is a native of the West Indies.

The ninth grows to the height of thirty feet or more, in its native state, with a straight trunk, covered with a smooth brown bark, dividing upwards into many branches which come out opposite, garnished with oblong leaves, resembling those of the Bay-tree in form, colour, and texture, but longer, and placed by pairs: when these are bruised or broken, they have a very fine aromatic odour like that of the fruit: the branches grow very regular, so that the trees make a fine appearance, and as they retain their leaves through the year, they are worthy of being propagated for ornament and shade about the habitations of the planters: the flowers are produced in large loose bunches from the side of the branches, towards their ends; each branch is also terminated by a larger bunch than the other; the flowers are small, and of an herbaceous colour. It is a native of the West Indies, flowering in June, July, and August.

The berries are chiefly imported from Jamaica, whence the name Jamaica Pepper; and it is also named All-spice, from a notion of its taste being compounded of several other spices.

It begins to bear fruit in three years after it is planted, but does not arrive at maturity until seven, then often yielding one thousand pounds weight of fruit from an acre.

According to the editor of Miller's Dictionary, "the berries are generally gathered in July in their green state, by twisting off the twigs with the hand, or a pole cleft at one end; and are laid on cloth spread over the barbiques or terraced floors raised a little above the ground, inclosed with an upright ledge of eight or ten inches in height, and divided by transverse partitions into four or more square compartments, that each may contain a day's picking. During the first and second day they are turned often, that the whole may be more exposed to the sun; but when they begin to dry, they are frequently winnowed, and laid in cloths to preserve them better from rain and dews, still exposing them to the sun every day, and removing them under cover every evening, till they are sufficiently dried; which usually happens in ten or twelve days, and is known by the darkness of their complexion, and the rattling of the seeds: they appear at this time wrinkled, and changed to a very dark brown. In this state, being ready for the

market, they are stowed in bags or casks. Some planters also kiln-dry them with great success."

Culture.—The first sort and all the different varieties are capable of being increased by planting cuttings of the strong young shoots of the same year, making them about six inches long, clearing about three inches of the bottom parts, then twisting them and setting them into pots filled with light rich earth, closing it well about them, and watering them to settle it. The pots should then be plunged in the tan hot-bed under glasses, carefully shading them from the sun. This should be done in the beginning of July, or in the early spring. It is likewise useful to cover them close with small glasses.

They may also sometimes be stricken in pots in the natural earth, under a shallow frame and glasses in the summer months, as well as in the open ground in a warm situation.

Slips set out or treated in the same manner as the cuttings, often strike root and produce good plants.

After the plants raised in any of the modes are well rooted and begin to shoot, they should be gradually inured to the open air, so as to be set out in it towards the latter end of August in a warm sheltered situation, being brought under the protection of the green-house in the beginning of autumn, and placed in the less warm parts of it, having free air admitted when the weather will permit. They should be gently watered during the winter, removing any decayed leaves that may appear upon them, and the mould of the pots kept quite clean. The plants also succeed perfectly when placed under a common frame in the winter season, air being freely admitted in fine weather.

In the succeeding spring the plants should be removed carefully with balls of earth about their roots into separate small pots of rich light earth, watering them well at the time, and setting them under a frame, or in the green-house, till perfectly established, when they may be removed into the open air, being placed in a warm aspect.

Towards the beginning of autumn they should be examined, and such plants as have their roots proceeding through the holes in the bottoms of the pots must be removed into others a size larger, loosening the mould and matted roots, afterwards filling the pots up with fresh rich earth, and watering them well. They should then be placed in a sheltered situation, trimming them to a regular figure, and turning them upright, when they have a tendency to be crooked, by proper sticks. When thus carefully trained while in their young growth,

the stems will afterwards continue straight without support.

They are also capable of being increased by layers. All such plants as are furnished with young bottom shoots low enough for laying may have them layed in spring, in the usual way, when they readily emit roots, and become fit to transplant into separate pots in the autumnal season.

And where seed is made use of it should be sown in spring, in pots of light mould, and plunged in a moderate hot-bed: the plants soon come up, which, when two or three inches high, should be potted off separately into small pots, and be managed afterwards as the others.

As the plants advance in growth, some new varieties may perhaps be produced.

Those who raise large quantities of these plants annually, should always keep some strong bushy plants, in order to furnish slips or cuttings for the purpose.

The Double-flowering and Orange-leaved Myrtles are the most difficult to raise by cuttings; and the last sort, and those with variegated leaves, are more tender than the others.

The common Broad-leaved, and Broad-leaved Dutch, as well as the Portugal sorts, succeed in the open ground in warm situations and dry soils.

Where they are intended to have bushy heads, the lower shoots should be trimmed off, and the plants only suffered to branch out at the top in different directions, so as to form handsome heads. Those which are designed to be shrubby, should have their lateral branches encouraged so that they may be well feathered from the top to the bottom. They should afterwards in general be left to take their own natural growth, except just taking off the rambling shoots. When their heads become thin and straggling, those shoots which are proper for sending out new shoots to fill up the vacancies and produce regularly should be shortened by the knife.

The practice of clipping the shrubs with garden-shears into globes, pyramids, &c., as is sometimes done, is very injurious; the necessary trimming should always be performed with the knife, and that only as above, as the plants appear to the most advantage when they grow naturally.

When the heads of the plants become very irregular, or thin and stubby, they may be renewed by heading down all the branches pretty short in spring, and shifting them into larger pots of fresh mould, with the balls of earth about their roots, giving plenty of water during summer, when they will branch out again finely, and form handsome full heads.

In respect to the general culture, as the plants advance in stature they should annually be removed into larger pots, according to the size of their roots; but care should be taken not to put them into pots too large, which causes them to shoot weak, and sometimes proves the destruction of them. When they are taken out of the former pots, the earth about their roots should be pared off, and that withinside the ball gently loosened, that the roots may not be too closely confined; and then often replace them in the same pots, when not too small, filling up the sides and bottom with fresh rich earth, and giving them plenty of water to settle the earth to their roots; which should be frequently repeated, as they require to be often watered both in winter and summer, and in hot weather they should have it in large quantities.

The proper season for shifting these plants is in April and August; for, if it be done much sooner in the spring, the plants are in a slow growing state, and not capable to strike out fresh roots again quickly; and when done later in autumn, the cold weather coming on prevents their taking root.

In the autumn, when the nights begin to be frosty, the plants should be removed into the green-house; but when the weather proves favourable they may remain abroad until the beginning of November; for, if they are carried into the green-house too soon, and the autumn should prove warm, they make fresh shoots at that season, which are weak, and often grow mouldy in winter. When the weather is so severe as to require the windows to be kept closely shut, they are often also greatly defaced; on which account they should always be kept as long abroad as the weather will permit, and be removed out again in the spring before they shoot out; and while they are in the green-house should have as much free air as possible when the weather is mild and proper for the purpose.

The tender kinds are mostly increased by seeds; but when any of them are pretty branchy, they may also be tried by layers and cuttings. And the eighth sort succeeds best in this way.

The seed should be procured from abroad, preserved in sand, &c., and be sown in spring in pots of fresh mould, plunging them in the bark-bed: the plants come up the same season; which, when two or three inches in height, should be planted out in separate small pots, and plunged in the bark-bed, supplying them with water, and managing them as other woody plants of the same kind.

As the second sort often branches out low, some of the young shoots may be layed in spring, by slit-laying or wiring, plunging the pots in

which they are layed in the tan-bed; when they will probably be well rooted in one year, though it is sometimes two before they strike good root, when they should be potted off into separate pots and managed as the others.

The last sort is best raised in this way.

The cuttings of some of the short young shoots should be made from such of the plants as afford them; planting them in pots of fresh compost in July, plunging them in the bark-bed, and covering them close with a low hand glass, giving due water.

They mostly take good root the same year, and are fit to plant out in separate small pots in the following spring.

The general management of these sorts is

only that of keeping them always in the stove, except a month in the heat of summer, when they may be set out in the open air. They should be suffered to shoot nearly in their own way, keeping them, however, to upright stems, and allowing their heads to branch out according to nature, except just reducing the very irregular branches, giving frequent waterings in common with other woody plants of the same kind, and shifting them occasionally into larger pots.

The first sort and varieties are highly ornamental plants for the borders and green-house, and the other tender sorts in the stove collections.

N A P

NAPÆA, a genus containing plants of the hardy herbaceous flowery perennial kind.

It belongs to the class and order *Diœcia Monadelphica* (*Monadelphica Polyandria*), and ranks in the natural order of *Columniferae*.

The characters are: that in the male the calyx is a bell-shaped five-cleft perianthium, round, permanent: the corolla has five oblong petals, concave, patulous, convex with oblong claws: the stamina have very many capillary filaments, of a middling length, connected in a column: anthers roundish, compressed: the pistillum is a conical germ, minute: style cylindric, ten-cleft, capillary: stigmas none: the pericarpium abortient: female on a distinct individual: the calyx and corolla as in the male: the stamina have filaments as in the male, but shorter: anthers small, effete: the pistillum is a conical germ: style as in the male, longer than the stamens: stigmas blunt: the pericarpium has ten capsules, converging into an ovate form, sharpish, awnless: the seeds are solitary, and kidney-form.

The species cultivated are: 1. *N. laevis*, Smooth Napæa; 2. *N. scabra*, Rough Napæa.

The first has a perennial root, frequently creeping: the stems smooth, about four feet high: the leaves alternate, upon pretty long slender foot-stalks, deeply cut into three lobes, which end in acute points, and are regularly serrate; those on the lower part of the stem are near four inches long, and almost as much in

N A P

breadth, but they diminish gradually to the top of the stem. At the base of the leaf comes out the peduncle, about three inches long, dividing at top into three smaller, each sustaining one white flower, smaller than in the second sort, with a longer column of stamens, the anthers standing out beyond the corolla. It is a native of Virginia.

The second has also a perennial root, composed of many thick fleshy fibres, striking deep into the ground, and connected at the top into a large head, from which come out many rough hairy leaves, near a foot diameter each way, deeply cut into six or seven lobes, irregularly indented on their edges, each lobe having a strong midrib, all meeting at the foot-stalk, which is large and long, arising immediately from the root: the flower-stalks seven or eight feet high, dividing into smaller branches, having one leaf at each joint, of the same form as those below, but diminishing in size towards the top, where they seldom have more than three lobes, which are divided to the foot-stalk. Towards the upper part of the stalk comes out from the side at each joint a long peduncle, branching out towards the top, and sustaining several white flowers, which are tubulous at bottom where the segments of the petal are connected, but spread open above, and are divided into five obtuse segments: the male plants are barren; but in the female plants the flowers are succeeded by ten capsules, placed in a ring, semicircular, finishing at top in a re-

curved dagger-point, compressed wedge-shaped, convex on the back, with a raised line along the middle, flat at the sides and subcrenulate towards the dorsal margin, one-celled, valveless, or sometimes but seldom opening by two valves: the flowers are in heads, and the fruit orbicular, depressed, consisting of eight or ten joints. It is also a native of Virginia.

Culture.—These plants are easily increased by seeds, which should be sown on a bed of common earth in the spring, keeping them clear from weeds till autumn, and then transplanting them where they are to remain. They succeed best in a rich moist soil, in which they will grow very luxuriantly, and must be allowed room.

The first sort may also be increased by parting the roots, and planting them out where they are to remain in the autumn.

They afford variety among other plants in the borders.

NAPELLUS. See ACONITUM.

NAPO-BRASSICA. See BRASSICA.

NAPUS. See BRASSICA.

NARCISSO-LEUCOIUM. See LEUCOIUM.

NARCISSUS, a genus containing plants of the bulbous-rooted perennial flowering kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx is an oblong spathe, obtuse, compressed, opening on the flat side, shrivelling: the corolla has six ovate, acuminate petals, flat, equal, inserted into the tube of the nectary externally above the base; nectary one-leafed, cylindric-funnel-form, coloured on the border: the stamina have six awl-shaped filaments, fixed to the tube of the nectary, shorter than the nectary: anthers oblongish: the pistillum is a roundish germ, obtusely three-sided, inferior: style filiform, longer than the stamens: stigma bifid, concave, obtuse: the pericarpium is a roundish capsule, obtusely three-cornered, three-celled, three-valved: the seeds are many, globular, and appendicled.

The species cultivated are: 1. *N. pseudo-narcissus*, Common Daffodil; 2. *N. poeticus*, Poetic, or White Narcissus; 3. *N. biflorus*, Two-flowered Narcissus, or Pale Daffodil; 4. *N. bicolor*, Two-coloured Narcissus; 5. *N. minor*, Least Daffodil; 6. *N. triandrus*, Rush-leaved Narcissus, or Reflexed Daffodil; 7. *N. orientalis*, Oriental Narcissus; 8. *N. Bulbocodium*, Hoop-Petticoat Narcissus; 9. *N. tazetta*, Polyanthus Narcissus; 10. *N. serotinus*, Late-flowering Narcissus; 11. *N. odoratus*, Sweet-scented Narcissus, or Great Jonquil; 12. *N. calathinus*, Calathine Yellow Narcissus; 13. *N. jonquilla*, Common Jonquil.

The first has a large bulbous root, from which

come out five or six flat leaves, about a foot long, and an inch broad, of a grayish colour, and a little hollow in the middle like the keel of a boat: the stalk rises a foot and half high, having two sharp longitudinal angles; at the top comes out one nodding flower, inclosed in a thin spathe: the corolla is of one petal, being connected at the base, but cut almost to the bottom into six spreading parts; in the middle is a bell-shaped nectary, called by gardeners the cup, which is equal in length to the petal, and stands erect: the petal is of a pale brimstone or straw colour, and the nectary is of a full yellow: the seeds are roundish, black. It is a native of many parts of Europe, flowering in March.

There are varieties with white petals and a pale yellow cup, with yellow petals and a golden cup, with a double flower; with three or four cups within each other; Tradescant's large double; long-tubed flowered; short-tubed; dwarf-stalked; and the peerless Daffodil.

Many other varieties have likewise been noticed by writers.

The second species has a smaller and rounder bulb than the first: the leaves are longer, narrower, and flatter: the stalk or scape does not rise higher than the leaves, which are of a gray colour: at the top of the stalk comes out one flower from the spathe, nodding on one side: the corolla snow white, spreading open flat, the petals rounded at the points: the nectary or cup in the centre is very short, and fringed on the border with a bright purple circle: the flowers have an agreeable odour, appear in May, and seldom produce seeds. It is a native of Italy, &c. flowering in April.

There are varieties with double white flowers, with purple-cupped flowers, and with yellow-cupped flowers.

The third usually produces two flowers: it frequently occurs, however, with one, more rarely with three; in a high state of culture it probably may be found with more. When it has only one flower, it may easily be mistaken for one of the varieties of the second sort, but may be distinguished from it by the petals being of a yellowish hue, or rather a pale cream colour; the nectary wholly yellow, not having the orange or crimson rim, and by its flowering at least three weeks earlier; the top also of the flowering stem very soon after it emerges from the ground bends down and becomes elbowed; whereas in that it continues upright till within a short time of the flower's expanding. It is a native of several parts of Europe, flowering in May.

There are two or three varieties, as with sulphur-coloured flowers, and with white reflexed petals, with gold-coloured borders.

The fourth species resembles the first; but

the petals are white, the nectary is dark yellow and larger, with a spreading, waved, notched border. Gouan thinks it is easily distinguished by its leaves, which are scarcely a palm in length and half an inch in breadth; by its large flower, with cordate-ovate petals, imbricate at the base, and sulphur-coloured, and by the nectary having a reflex mouth, twelve-cleft or thereabouts, the lobes also being toothed and curled: the scape is the length of the leaves, or a little shorter, and thick. It is a native of the South of Europe, flowering in April and May.

There is a large variety, which approaches in its general appearance very near to the first sort; but it is a much taller plant, and has its leaves more twisted, as well as more glaucous: the flower, but especially the nectary, is much larger, and the petals are more spreading. It is of a fine deep yellow colour, having sub-varieties with double flowers, and is a native of Spain, flowering in April. It is sometimes known by the title of Great Yellow *Spanish-Bastard Daffodil*.

The fifth is nearly related to the first sort, but is three times smaller in all its parts: the scape is scarcely striated: the spathe is greenish: the flowers more nodding: the petals distinct at the base, lanceolate, straight, not oblique or ovate: the margin of the nectary six-cleft, waved, curled. But though the flowers are not so large as those of the other species, when the roots are planted in a cluster, they make a very pretty show, and have this advantage, that they flower somewhat earlier than any of the others. It is a native of Spain.

The sixth is of the same size with the second, but the leaves are narrower by half and channelled: the spathe one-flowered: the whole corolla snow-white: the petals ovate-oblong: the nectary bell-shaped, shorter by half than the corolla, with the margin straight, and unequally crenulate: the stamens three, seldom six: the anthers dark yellow, shorter than the nectary. In nurseries the flowers are of a pale yellow, having two and sometimes three flowers from a spathe. It is a native of Portugal.

There are varieties with cup and petals wholly of a gold colour; with yellow with a white cup; and with white, with a yellow cup.

The seventh species is broad-leaved, having the appearance of the ninth sort: the corolla is white: the nectary erect, half or one-third of the length of the petals, trifid, yellow, with the lobes emarginate. It is a native of the Levant, flowering in May.

There are several varieties.

The eighth has small bulbs: the leaves very narrow, having some resemblance to those of the Rush, but a little compressed, with a longi-

tudinal furrow on one side; they are seldom more than eight or nine inches long: the flower-stalk slender, taper, about six inches long: petal scarce half an inch long, cut into six acute segments: the nectary or cup is more than two inches long, very broad at the brim, lessening gradually to the base, formed somewhat like the old farthingale or bell-hoop petticoat worn by the ladies. It is a native of Portugal, flowering in April or May.

The ninth species has a large, roundish bulb: the leaves three or four, long, narrow, plane: the scape or flower-stalk upright, broadish, angular, concave, from ten or twelve to eighteen inches in height: the flowers six or seven to ten from one spathe, very fragrant, clustered, white or yellow. It is a native of Spain and Portugal, &c., flowering in February and March.

There are a great many varieties: the principal of which are; with yellow petals, with orange, yellow, or sulphur-coloured cups or nectaries; with white petals, with orange, yellow, or sulphur-coloured cups or nectaries; with white petals, with white cups or nectaries; and with double flowers of the different varieties.

The flower catalogues contain about a hundred sub-varieties under these heads. It may be observed, that "the varieties with white petals and white cups are not so much esteemed as the others; there are, however, two or three with large bunches of small white flowers, which are valuable for their agreeable odour, and for flowering later than most of the others. There is also one with very double flowers, the outer petals white, those in the middle some white, others orange-coloured," which "has a very agreeable scent, flowers early, and is generally called the *Cyprus Narcissus*," and is the most beautiful of all the varieties when blown in glasses in rooms or other places.

The tenth has a small bulb: the leaves few, narrow: the stalk jointed, nine inches high: the corolla white, cut into six narrow segments: the cup yellow. It flowers late in the autumn, and is a native of Spain, Italy, and Barbary.

The eleventh species has the flower deep yellow, three times as large as that of the ninth, sometimes one only from a spathe, but frequently more: the nectary not fringed, but divided at the mouth into six blunt lobes. It possesses more fragrance than many of the others. It is a native of the South of Europe, flowering in April and May.

It varies with double flowers.

The twelfth resembles the ninth very much, but the petals are a little larger and sharper; the nectary is the same length with the petal: the leaves two or three, a foot or more in length: the stem is slender, strong, a foot in length: the

flowers two or three from a spathe, very elegant, large and loose: the petals yellow: the cup half an inch long, sinuated at the edge, of a deeper yellow colour. It flowers in April, and is a native of the southern parts of Europe and of the Levant.

The thirteenth is named from the narrowness of its leaves, like those of Rushes; there are two or three of them usually on a plant, and they are angular, fleshy, and almost round: the scape is round, hollow, producing at top from three to five flowers from a spathe, sometimes no more than two, very fragrant petals orbiculate or mucronate, both they and the cup yellow: the bulb small, white, covered with dark membranes. It is a native of Spain, flowering in April and May.

It varies with double flowers.

Culture.—All these different species and varieties may be increased with facility, by planting the off-set bulbs from the roots; and by sowing the seed in order to procure new varieties, which is chiefly practised for the fine sorts of *Polyanthus Narcissus*.

For this last purpose the seed should be carefully saved from the best and most curious plants after being perfectly ripened.

The seed should be sown soon after it becomes ripe, as about the beginning of August, in shallow boxes or flat pans perforated with holes in the bottoms, and filled with fresh light sandy earth, being covered about a quarter of an inch deep with fine sifted mould, and placed in such situations as are only exposed to the morning sun, till the beginning of winter, when they should be removed to have the full sun, and be sheltered from severe weather. In the spring, when the plants appear, they should be occasionally watered in dry weather, and be screened from the mid-day heat, removing them into cooler situations as the warm season advances, keeping them free from all sorts of weeds. Towards the latter end of the summer, when their stems decay, the surface mould of the boxes or pans should be stirred or wholly removed, and some fresh mould sifted over the plants, being careful not to disturb the roots, and keeping them rather dry in a shaded place.

They should have the same management annually, till the period of their leaves decaying in the third summer, when the bulbs should be taken up, and the largest separated and planted out on raised beds of light fine mould, in rows six inches apart, and three or four distant in them, having the depth of two or three inches. The smaller bulbs may be covered in on another bed with fine mould, to

remain till of sufficient size to be planted out as above.

They should afterwards be kept clean; and when they show flowers so as to ascertain their properties, they may be removed, and managed in the manner directed below.

The off-set bulbs of the old plants, especially the double sorts, should be separated from the roots annually, or at furthest every two or three years, in the latter part of the summer, when their leaves and stems decay, planting their larger bulbs out at different times, from the end of August to the beginning of November, in order to afford variety; but the earlier they are planted the stronger they blow. When left out of the ground till February, or later, they mostly appear weak.

They succeed best where the soil is of a light, dry, fresh, hazel, loamy quality, and the aspect south-easterly; as where inclined to moisture they are very apt to be destroyed.

They afterwards only require to be kept free from weeds, and to have the ground stirred above them in the autumn.

The small bulbs may be planted out in rows in nursery-beds to increase for being planted out in the same manner.

When these roots are planted in the open borders or other places, in assemblage with other bulbous flowers, they should be deposited in little patches, about three or four roots in each, putting them in with a blunt dibble, or holing them in with a garden-trowel, three or four inches deep; in which mode they display their flowers more conspicuously than when planted singly.

Where a large quantity are planted out alone in beds in order to exhibit a full bloom, as often practised with the fine *Polyanthus-Narcissus*, Jonquils, &c. the beds should be four feet wide, with foot-and-half or two-feet wide alleys between them; in these beds the roots should be planted in rows length-ways, nine inches asunder, either with a blunt dibble or with a hoe, three or four inches deep, and six distant in each row, covering them evenly with the earth, and raking the surface smooth.

In order to blow the *Polyanthus-Narcissus* and Jonquil in the highest perfection, curious florists often bestow particular care in their culture: some, preparing beds of compost, as for the fine Hyacinths, &c. managing them in the same manner. But they succeed well in beds of light dry mould.

Where the bulbs of this sort are intended for sale, they should be lifted at furthest every two years, to prevent their becoming flattened by pressure, and of course less valuable.

The bulbs may be retained out of the ground

two or three months where it is necessary; but it is better to replant them as above.

Culture in Glasses.—It is sometimes the practice to cultivate the *Polyanthus Narcissus* and some of the large Jonquil kind in glasses in rooms, in order to blow in the winter or early spring season. For this purpose dry firm bulbs should be chosen, and one placed in each single glass or bottle provided for the purpose, any time from October till the spring, being then filled up to the roots of the bulbs with soft water, and deposited in a light warm place: in this method the plants soon begin to grow, and send forth flower-stems, affording good flowers, which have a very ornamental appearance.

The principal circumstances to be regarded in this management are, those of keeping the glasses well supplied with fresh portions of water, so as constantly to be up to the lower part of the roots, and changing the whole, so as to keep it always in a pure state.

They may likewise be raised in pots filled with light sandy mould, and placed in the same situations.

Also in hot-houses, they may be made to blow early, when kept either in pots or glasses.

When planted out in the manner mentioned above, in the borders, clumps, and other parts of pleasure-grounds, they are most of them highly ornamental, producing much variety in the early spring months.

All the different principal sorts may be procured from the seeds-men in London, who import them for sale from Holland, where they are raised in large quantities.

NASTURTIUM. See TROPEOLUM.

NAVELWORT. See COTYLEDON and CYNOGLOSSUM.

NAVEW. See BRASSICA.

NECTARINE. See AMYGDALUS.

NELUMBO. See NYMPHÆA.

NEPETA, a genus containing plants of the herbaceous perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved perianthium, tubular, cylindric: mouth five-toothed, acute, erect: upper toothless longer; lower more spreading: the corolla is one-petalled, ringent: tube cylindric, curved inwards: border gaping, opening, spreading, cordate, ending in two reflex blunt very short segments: upper lip erect, roundish, emarginate; lower roundish, concave, larger, entire, crenulate: the stamina have four awl-shaped filaments beneath the upper lip, approximating, two of them

shorter: anthers incumbent: the pistillum is a four-cleft germ: style filiform, length and situation of the stamens: stigma bifid, acute: there is no pericarpium: calyx straight, containing the seeds in its bosom: the seeds four, and sub-ovate.

The species cultivated are: 1. *N. cataria*, Common Catmint; 2. *N. Pannonica*, Hungarian Catmint; 3. *N. nuda*, Naked or Spanish Catmint; 4. *N. Italica*, Italian Catmint; 5. *N. tuberosa*, Tuberous-rooted Catmint.

The first has a perennial root, from which arise many branching stalks, two feet high and more, upright, pubescent: the leaves are of a velvet-like softness, wrinkled, ash-coloured or hoary, particularly underneath: spikes composed of interrupted whorls terminate the stem, and come out in branches from the axils of the leaves: the flowers are subsessile, and separated at the base by a small lanceolate bracte: the calyx downy with green ribs: the corolla white, with a tinge of red, and spotted with purple: the whole plant has a strong scent between Mint and Pennyroyal. It is called Catmint, from cats being very fond of it. It is a native of most parts of Europe, flowering from July to September.

The second species has a perennial root, branched, woody, the size of a quill or more, brown on the outside, knobbed at the end: the stems several, from three to four feet in height, grooved, smoothish, with opposite branches forming a panicle: the leaves oblong, blunt, scarcely cordate, bluntly serrate, smooth, the lower ones on longer petioles, the upper ones on very short ones; they are successively smaller as they approach the racemes, till they become so small that the ends of the racemes seem to be leafless: the racemes are axillary and opposite, containing about twenty flowers: the bractes almost bristle-shaped: the calyx somewhat villose and striated: the corolla more or less red; in the cultivated plant very deep, and elegantly dotted. It is a native of Hungary, &c., flowering from August to October.

The third has the stems two feet high, smooth, strict, four-grooved; the older ones dark purple: the leaves blunt, veined, naked, rugged on both sides: the racemes brachiate: the bractes linear: the flowers distinct: the corollas whitish-rufoescent, with the beard of the palate white, and the throat dotted with purple. According to Haller, the flowers are blue and white. It is a native of the South of Europe, flowering from June to August.

In the fourth species, the stalks seldom rise more than a foot and half high, sending out very few branches: the whorls of flowers



Painted by Syd. Edwards
 1 *Nelumbium speciosum*
 Chinese Water Lily

London Published Apr. 1 1866 by G. Kearsley Fleet Street

Engraved by F. Sanson
 2 *Nolana prostrata*
 Trailing *Nolana*

which form the spike are distant from each other, and sit close to the stalk: the leaves short, oval, heart-shaped: the plant is hoary and strong scented. It is a native of Italy, flowering from June to August.

The fifth has a thick knobbed root, from which come out one or two stalks, that often decline to the ground; they are about two feet and a half long, and send out two side branches opposite: the leaves are oblong, crenate, sessile, deep green: the upper part of the stalk, for more than a foot in length, has whorls of flowers, the lower ones two inches asunder, but nearer all the way up; they sit very close to the stalks, and are guarded by small bractes: the corolla is blue. It is a native of Spain and Portugal, flowering from June to August.

Culture.—These plants are capable of being increased by seeds, parting the roots, slips, and cuttings, but the first is the principal mode.

The seeds may be sown in the autumn or spring, on a bed of light earth, raking it in lightly: when the plants have attained some growth, they may be planted out in nursery rows, to remain till the autumn, when they may be set out where they are to remain; or they may remain where sown, only thinning them properly out.

The partings of the roots may be set out separately, where they are to remain, in the beginning of the autumn, or spring, being afterwards kept free from weeds.

Slips or cuttings of the branches may be planted out in the spring in shady situations, occasional supplies of water being given till they have stricken root.

The first sort and varieties, as well as many of the others, may afford variety in the borders, clumps, and other parts of pleasure-grounds, in mixture with herbaceous plants of different descriptions. They are likewise some of them cultivated for medicinal use.

NERIUM, a genus comprehending plants of the evergreen flowering shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-parted perianthium, acute, very small, permanent: the corolla is one-petalled, funnel-form: tube cylindric, shorter than the border: border very large, five-parted; segments wide, blunt, oblique: nectary a crown terminating the tube, short, lacerated into capillary segments: the stamina have five, awl-shaped filaments, very short, in the tube of the corolla: anthers sagittate, converging, terminated by a long thread: the pistillum a roundish germ, bifid: style cy-

Vol. II.

lindric, the length of the tube: stigma truncate, sitting on an orblet, fastened to the anthers: the pericarpium has two follicles, round, long, acuminate, erect, one-valved, opening longitudinally: the seeds numerous, oblong, crowned with down, placed imbricately.

The species cultivated are: 1. *N. oleander*, Common Rosebay, or Oleander; 2. *N. odorum*, Sweet-Scented Rosebay, or Oleander; 3. *N. antidysentericum*, Oval-Leaved Rosebay; 4. *N. coronarium*, Broad-Leaved Rosebay.

The first rises with several stalks to the height of eight or ten feet: the branches come out by threes round the principal stalks, and have a smooth bark, which in that with red flowers is of a purplish colour, but in that with white flowers of a light green: the leaves for the most part stand by threes round the stalks, upon very short footstalks, and point upwards; they are three or four inches long, and three quarters of an inch broad in the middle, of a dark green, very stiff, and end in acute points: the flowers come out at the end of the branches in large loose bunches, and are of a bright purple, or crimson colour, or of a dirty white. It is a native of the Levant, flowering in July and August.

In warm dry summers this plant makes a fine appearance, the flowers then opening in great plenty; but in cold moist seasons the flowers often decay without expanding, unless the plants are placed in a green-house or under a glass-case.

The variety with white flowers is the most tender; but there are others, as the Stripe-leaved; the Broad-leaved Double-flowered, the Striped Double-flowered, and with different shades of red from purple to crimson or scarlet.

The second species rises with shrubby stalks six or seven feet high, covered with a brown bark: the leaves are stiff, from three to four inches long, and not more than a quarter of an inch broad, of a light green, and the edges reflexed; they are opposite, or alternate, or by threes round the branches: the flowers are produced in loose bunches at the ends of the branches; they are of a pale red, and have an agreeable musky scent. It grows naturally in India, flowering from June to August.

There is a variety with leaves six inches long, and one inch broad in the middle, of a much thinner texture than those of the first, and their ends are generally reflexed; they are of a light green, and irregularly placed on the branches by pairs, alternately, or by threes: the flowers are produced in very large bunches at the end of the branches, upon long peduncles; they have three or four rows of petals one within another: they are much larger than those of the common

U

sort, and smell like those of hawthorn: the plain flowers are of a soft red or peach colour; but in most they are beautifully variegated with a deeper red, and make a fine appearance: the usual time of flowering is in July and August, but in a warm stove it will continue in flower till Michaelmas: from the flowers being double, they are not succeeded by seeds. They are all supposed to have a poisonous quality.

The third is a middle sized tree, with brachiate branches: the leaves opposite, flat, quite entire, smooth: the flowers herbaceous or greenish white, in short subterminating racemes: the segments of the crown oblong, alternately trifid and linear. It is a native of the East Indies.

The fourth species is an elegant branched shrub, four feet high, milky, with an ash-coloured bark: the younger branches are shining, green, compressed a little, opposite at the end: the leaves long, lanceolate, acute, quite entire, shining, on short petioles, opposite: the peduncles one-flowered, thickish, in pairs from the divisions of the branchlets and decussating with them: the flowers handsome, but without scent: the perianthium green: tube of the corolla greenish yellow: the border snow-white. It is a native of the East Indies, flowering most part of the summer.

Culture.—These plants may be increased by layers, cuttings, and suckers from the roots.

The layers should be made in the early spring months, as from March till May, but the earlier the better; the youngest lower branches being chosen for the purpose, which should be slit-layed, giving plenty of water during the summer, and they will be mostly rooted by the autumn following; but by plunging the pots in which they are layed in a bark hot-bed their rooting may be greatly forwarded: when they are properly rooted, they may be taken off and removed into separate pots.

The cuttings should be planted in the spring or the early part of summer, taking off the young shoots, five or six inches long, and planting them in large pots of rich mould, placing them under glasses, and giving water and shade occasionally: but if plunged in a bark-bed it will greatly promote and forward their rooting.

The suckers arising from the bottom are sometimes furnished with roots, but when this is not the case a small slit should be given at the lowest part; afterwards applying fresh mould around it, when fibres will be emitted by the end of summer; they may then be taken off and potted separately.

The first sort and varieties is rather hardy, but should be kept constantly in pots or tubs, to be protected through severe winters.

The other sorts are often placed in the hot-house during winter, but when less tenderly treated and supplied more freely with air in mild weather, they are said by some to succeed better, provided they be carefully screened from every effect of frost or severe cold.

They are very ornamental among other potted plants of the less tender kinds.

NETTLE-TREE. See *CELTIS*.

NEW JERSEY TEA. See *CEANOTHUS*.

NICKER TREE. See *GUILANDINA*.

NICOTIANA, a genus containing plants of the herbaceous annual kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridae*.

The characters are: that the calyx is a one-leaved perianthium, ovate, half-five-cleft, permanent: the corolla is one-petalled, funnel-form: tube longer than the calyx: border somewhat spreading, half-five-cleft, in five folds: the stamina have five awl-shaped filaments, almost the length of the corolla, ascending: anthers oblong: the pistillum is an ovate germ: style filiform, the length of the corolla: stigma capitate, emarginate: the pericarpium is a subovate capsule, marked with a line on each side, two-celled, two-valved, opening at top: receptacles half-ovate, dotted, fastened to the partition: the seeds numerous, kidney-form, wrinkled.

The species cultivated are: 1. *N. fruticosa*, Shrubby Tobacco; 2. *N. Tabacum*, Virginian Tobacco; 3. *N. rustica*, Common or English Tobacco.

The first rises with very branching stalks about five feet high: the lower leaves a foot and half long, broad at the base where they half embrace the stalks, and about three inches broad in the middle, terminating in long acute points: the stalks divide into many smaller branches, terminated by loose bunches of flowers of a bright purple colour, succeeded by acute-pointed seed-vessels. It was found at the Cape.

There is a variety which rises about five feet high: the stalk does not branch so much as that of the former: the leaves are large and oval, about fifteen inches long and two broad in the middle, but diminish gradually in size to the top of the stalk, and with their base half embrace it: the flowers grow in closer bunches than those of the former, and are white: they are succeeded by short, oval, obtuse seed-vessels. It flowers about the same time with the former, and grows naturally in the woods of the island of Tobago.

The second species has a large, long, annual root; an upright, strong, round, hairy stalk, branching towards the top; leaves numerous, large, pointed, entire, veined, viscid, pale green;

bractes long, linear, pointed: the flowers in loose clusters or panicles: the calyx hairy, about half the length of the corolla, cut into five narrow segments: tube of the corolla hairy, gradually swelling towards the border, where it divides into five folding acute segments of a reddish colour. It is a native of Virginia.

There are several varieties; as the great broad-leaved, in which the leaves are more than a foot and a half long, and a foot broad, their surfaces very rough and glutinous, and their bases half embrace the stalk. In a rich moist soil the stalks are more than ten feet high, and the upper part divides into smaller branches, which are terminated by loose bunches of flowers standing erect: they have pretty long tubes, and are of a pale purplish colour. It flowers in July and August, and is the sort commonly brought to market in pots, being sometimes called *Oronoko Tobacco*.

There is another, in which the stalks seldom rise more than five or six feet high, and divide into more branches. The leaves are about ten inches long and three and a half broad, smooth, acute, sessile; the flowers are rather larger, and of a brighter purple colour. It flowers at the same time; and is called by some *Sweet-scented Tobacco*.

The narrow-leaved rises with an upright branching stalk, four or five feet high. The lower leaves are a foot long, and three or four inches broad: those on the stalks are much narrower, lessening to the top, and end in very acute points, sitting close to the stalks; they are very glutinous. The flowers grow in loose bunches at the top of the stalks; they have long tubes, and are of a bright purple or red colour. They appear at the same time with the former.—These varieties are also all natives of America.

The third has the stalks seldom rising more than three feet high: the leaves smooth, alternate, upon short footstalks: the flowers in small loose bunches on the top of the stalks, of an herbaceous yellow colour, appearing in July. It is commonly called *English Tobacco*, from its having been the first introduced here, and being much more hardy than the other sorts. It came originally from America, under the name of *Petum*.

There is a variety which rises with a strong stalk near four feet high; the leaves are shaped like those of the preceding, but are greatly furrowed on their surface, and near twice the size, of a darker green, and on longer footstalks. The flowers are of the same shape, but larger.

Culture.—The two first sorts may be increased by sowing the seeds annually in the spring,

as March, on a hot-bed, the last in the natural ground.

The seeds should be covered about a quarter of an inch deep; and when the plants are come up they should be allowed fresh air daily, and occasional waterings, managing them as tender annuals. When the plants are from three to six inches high, as in May or the following month, they should be planted out in moist weather, in the open ground; such as are designed for ornament, singly, and those intended for use, in rows, any where, three feet asunder; giving a good watering as soon as planted, repeating it occasionally till the plants have got fresh root.

The second species may also be raised by sowing the seeds in a warm border in April, for setting out in the same manner, or by sowing in patches in the flower borders, &c. to remain, thinning the plants afterwards to one in each patch.

In the third sort the seeds may be sown in any bed or border in the spring, raking them in lightly. When the plants are three inches high, they should be planted out where they are to remain; or they may be sown in patches to remain, thinning the plants out afterwards as above.

In America, where regular plantations are made, the method is this:

“The beds being prepared and well turned up with the hoe, the seed, on account of its smallness, is mixed with ashes, and sown upon them, a little before the rainy season. The beds are raked, or trampled with the feet, to make the seed take the sooner. The plants appear in two or three weeks. As soon as they have acquired four leaves, the strongest are drawn up carefully, and planted in the field by a line, at the distance of about three feet from each plant. If no rain fall, they should be watered two or three times. Every morning and evening the plants must be looked over, in order to destroy a worm which sometimes invades the bud. When they are about four or five inches high they are to be cleaned from weeds and moulded up. As soon as they have eight or nine leaves, and are ready to put forth a stalk, the top is nipped off, in order to make the leaves longer and thicker. After this the buds which sprout at the joints of the leaves are all plucked, and not a day is suffered to pass without examining the leaves, to destroy a large caterpillar which is sometimes very destructive to them. When they are fit for cutting, which is known by the brittleness of the leaves, they are cut with a knife close to the ground; and, after lying some time, are carried to the drying

shed or house, where the plants are hung up by pairs, upon lines, leaving a space between that they may not touch one another. In this state they may remain to sweat and dry. When perfectly dry, the leaves are stripped from the stalks, and made into small bundles tied with one of the leaves. These bundles are laid in heaps, and covered with blankets. Care is taken not to overheat them, for which reason the heaps are laid open to the air from time to time and spread abroad. This operation is repeated till no more heat is perceived in the heaps, and the Tobacco is then stowed in casks for exportation." But, "In China, where the use of tobacco both in snuff and for smoking is very general, buildings are not thought necessary, according to sir George Staunton, as they are in the West Indies, for curing it; there being little apprehension of rain to injure the leaves when plucked. They are hung on cords to dry without any shelter, upon the spot in which they grew."

It is probable that this plant might be grown with advantage in this climate if it were not prohibited.

These sorts, when cultivated for the purpose of ornament, produce a fine effect by their leaves and flowers in the autumn, and also afford much variety.

NIGELLA, a genus containing plants of the hardy herbaceous flowering annual kind.

It belongs to the class and order *Polyandria Pentagynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx: the corolla has five petals, ovate, flat, blunt, spreading, more contracted at the base: the nectaries eight, placed in a ring, very short; each two-lipped; outer lip larger, lower, bifid, flat, convex, marked with two dots; inner lip shorter, narrower, from ovate ending in a line: the stamens have numerous awl-shaped filaments, shorter than the petals. Anthers compressed, blunt, erect: the pistillum has several germs (five to ten), oblong, convex, compressed; erect, ending in styles which are awl-shaped, angular, very long, but revolute, permanent: stigmas longitudinal, adnate: the pericarpium capsules as many, oblong, compressed, acuminate, connected on the inside by the suture, gaping on the inside at top: the seeds very many, angular, and rugged.

The species cultivated are: 1. *N. damascena*, Common Fennel-flower; 2. *N. saliva*, Small Fennel-flower; 3. *N. arvensis*, Field Fennel-flower; 4. *N. Hispanica*, Spanish Fennel-flower; 5. *N. orientalis*, Yellow Fennel-flower.

The first rises with an upright branching stalk a foot and a half high: the leaves much longer and finer than those of the third: the flowers are large, pale blue, with a five-leaved involucre under each, longer than the flower; they are succeeded by larger swelling seed-vessels, with five horns at the top. It is a native of the South of Europe, flowering from June to September.

From the fine cut leaves about the flower, it has the names of *Fennel-flower*, *Devil-in-a-bush*, and *Love-in-a-mist*; but the first is become obsolete.

There is a variety with single white flowers, and another with double flowers, which is frequently cultivated in gardens with other annuals for ornament.

The second species rises to the same height as the preceding: the leaves are not so finely cut, and are a little hairy: at the top of each stalk is one flower, composed of five white petals, which are slightly cut at their end into three points; these are succeeded by oblong swelling seed-vessels with five horns at the top, filled with small pale-coloured seeds. It is a native of Candia and Egypt, flowering from June to September.

The third rises with slender stalks near a foot high, either single or branching out at the bottom, and having a few very fine-cut leaves, somewhat like those of Dill. Each branch is terminated by one star-pointed flower, of a pale blue colour, without any leafy involucre: they are succeeded by capsules, having five short horns, inclining different ways at the top, and are filled with rough black seeds. It is a native of Germany, &c. flowering from June to September.

There is a variety with white flowers, and another with double flowers.

The fourth species rises near a foot and half high; the lower leaves are finely cut; but those on the stalks are cut into broader segments: the flowers are larger than those of the other species, and of a fine blue colour, with green veins at the back: the nectaries of a sea-green colour: the pistils are of equal length with the petals; they with the stamens are of a deep purple or puce colour: the capsule has five horns, and is of a firmer texture than any of the other. It grows naturally in Spain and the South of France, flowering from June to September.

There is a variety with double flowers.

The fifth rises with a branching stalk a foot and a half high; with pretty long leaves, finely divided: the flowers are produced at the end of the branches: the petals are yellowish; at the base of these are placed eight nectaries, between



Painted by Syd Edwards

London Published Nov 1st 1865 by G. Kearsley Fleet Street

Engraved by E. S. Dainton

Nigella Damascena
 1 Love in a mist. Devil in a bush.

Narcissus Jonquilla
 2 Jonquill.

which arise a great number of stamens, with an unequal number of germs, from five to eight or nine, oblong and compressed: the capsules are joined together on their inner side, terminate in horns, open longitudinally, and contain many thin compressed seeds, having borders round them. It is a native of Syria, flowering from July to September.

Culture.—They are all increased by sowing the seeds on light earth where the plants are to remain, as they seldom succeed well when transplanted in patches at proper distances; and when the plants are come up, they should be thinned, leaving only three or four in each patch, keeping them afterwards clear from weeds.

The best season for sowing is March; but if some be sown in August, soon after they become ripe, on a dry soil and in a warm situation, they will abide the winter, and flower strong the succeeding year. By sowing the seeds at different times, they may be continued in beauty most part of the summer season.

As they are all annual plants, they require to be raised every year.

The varieties with double flowers are chiefly introduced into flower gardens.

They afford ornament and variety among other annuals in the clumps and borders.

NIGHTSHADE. See **SOLANUM**.

NOLANA, a genus containing a plant of the herbaceous trailing annual kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*, or *Luridae*.

The characters are: that the calyx is a one-leaved perianthium, turbinate at the base, five-parted, five-cornered: segments cordate, acute, permanent: the corolla is one-petalled, bell-shaped, plaited, spreading, somewhat five-lobed, twice as large as the calyx: the stamina have five awl-shaped filaments, erect, equal, shorter than the corolla: anthers sagittate: the pistillum is as five roundish germs: style among the germs, cylindric, straight, the length of the stamens: stigma capitate: the pericarpium properly none: (drupes five, decumbent, three- or five-celled:) the seeds five, with a succulent rind, roundish, with the inner base naked, immersed in the receptacle, two-celled and four-celled (solitary).

The species is *N. prostrata*, Trailing Nolana.

It has an annual root, simple, filiform, often three feet long, blackish: the stem a foot long, herbaceous, prostrate, roundish, very smooth, with white dots scattered over it: the branches alternate, the lower ones the length of the stalk:

the leaves alternate, two together, reflex, rhomb-ovate, quite entire, blunt, somewhat fleshy, an inch long, somewhat papulose, even, flat, veined, unequal, alternately larger and smaller. According to Miller they come out single at some joints, by pairs at others, and frequently three or four at the upper joints: the petioles ancipital, scarcely shorter than the leaves, smooth, those belonging to the upper leaves vaguely ciliate: the peduncles lateral, solitary, spreading a little, an inch long, one-flowered, round, thicker at top, hairy: the flowers inferior. It is a native of Java.

Culture.—These plants may be raised by sowing the seeds on a hot-bed in March. When the plants are fit to remove, they should be planted out singly into small pots filled with light earth, plunging them into a fresh hot-bed to bring them forward. When their flowers open in the summer, as July, they should have a large share of air admitted when the weather is warm, to prevent their falling away without producing seeds. Under this management the plants often continue flowering till the early frosts destroy them, and ripe seeds are produced in the beginning of the autumn.

They afford variety among other tender annuals.

NOLI ME TANGERE. See **IMPATIENS**.

NONE-SO-PRETTY. See **SAXIFRAGA**.

NOSE-BLEED. See **ACHILLEAS**.

NUCIPERSICA. See **AMYGDALUS**.

NURSERY, a portion of ground set apart for the raising and nursing various sorts of trees, shrubs, and herbaceous plants to proper states of growth for supplying the different gardens, orchards, plantations, and other departments.

In these situations are raised all the different sorts of fruit-trees, and fruit-bearing shrubs, by nursing and training them up to proper sizes and growths for planting where they are to remain to produce their fruit, as well as the vast train of forest-trees, hardy ornamental trees, and deciduous and ever-green shrubs, training them up properly for the purposes for which they are designed in plantations and pleasure-grounds.

And various sorts of hardy herbaceous plants, both of the fibrous-, bulbous-, and tuberous-rooted kinds may be here provided in proper states for being planted out.

These different sorts of plants are raised by seed, suckers, layers, cuttings, slips, off-sets, parting the roots, grafting, budding, &c. as directed under their several heads.

And as some of the various sorts are drawn off annually, to supply different situations, a fresh supply of young plants should be accord-

ingly raised every year in the Nursery, of most of the various kinds, so as to have it always fully stocked with most kinds in different states of growth; some in seed-beds, others transplanted in nursery-rows; some one year, others two, three, or several years: all of which should be well attended to, that there may be a sufficiency of plants of all sorts for furnishing every different department of gardening as they may be wanted.

In public Nursery-grounds, it is customary to have convenient green-houses, glass-cases, and stoves, with their proper appendages, for raising tender exotics from the warmer parts of the globe, which are always placed in the warmest and most sunny situations, having their fronts directly facing the south, to have all possible benefit from the sun's influence; which serve for raising and nursing the various tender plants to a proper growth for furnishing other larger conservatories, green-houses, &c.

Size, Soil, and Situation. In respect to the extent or dimensions of Nursery-grounds, they should be according to the quantity of plants required, or the demand for sale: if for private use, from a quarter or half an acre to five or six may be proper, which should be regulated according to the extent of the garden-ground and plantations they are required to supply; and if for public or general cultivation, not less than three or four acres of land will be worth occupying, and from that to fifteen or twenty acres, or more, may be requisite, in proportion to the demand.

The soil for Nursery-grounds should be of different qualities, in order that it may suit different sorts of trees and plants.

Nursery-men generally prefer a loamy soil of a moderately light nature: however, they may be formed of any good moderately light land, that has fifteen or eighteen inches depth of good working soil, but if two or three spades deep it will be the better; and where there is scope of ground to choose from, that where there is a good depth, and a naturally rich or good soil, should be preferred, as the soil of a Nursery cannot be too good, notwithstanding what has been advanced to the contrary; as where the soil is poor and lean, the plants are mostly languid, weak, and stunted, no art being able to improve them; while those raised in a good mellow soil always assume a free growth, and advance with strength and vigour. It is not requisite, however, that the soil should be very rich, nor over manured: a medium between the two extremes is the most proper, such as good mellow pasture land, having the sward trenched to the bottom, which is ex-

cellent for the growth of trees; and any similar eligible soil of corn-fields is also extremely proper: any other good soil of the nature of common garden-earth is likewise well adapted for a Nursery-ground.

As to situation; where it is rather low than high it is better, as being naturally warmer, and more out of the power of cutting and boisterous winds than a higher situation, though where some parts of the ground are high and others low, it may be an advantage, in better suiting the nature of the different plants. It is also of vast advantage to have Nursery-grounds fully exposed to the sun and free air, and, if possible, where there is the convenience of having water for the occasional watering of young seedlings, and newly removed plants.

When for private use, where there is room, Nursery-grounds may either be entirely detached, or contiguous to the outer boundaries of the shrubbery plantations of the pleasure-ground, and so contrived as to lead insensibly into it by winding walks, so as to appear part of the garden or shrubbery.

Method of inclosing, preparing, and laying out. In respect to the outside fence, it may either be a hedge and ditch, or a paling; the former is the cheapest, and most durable; though where hares and rabbits abound paling fences are most eligible.

Paling, or other similar close fence, is however in general, for some part, extremely useful to train young wall-trees to a proper growth for garden-walls, &c.

After thus fenced in, the ground should be all regularly trenched over one or two spades deep, according to the natural depth of the soil; after which, proceed to divide it by walks into quarters, and other parts; letting a principal walk lead directly through the middle or some principal part, which may be from five to eight or ten feet wide, according to circumstances, having a broad border on each side: another walk should be carried all round next the outward boundary, four or five feet wide, leaving an eight or ten feet border next the fence all the way; dividing the internal part by smaller cross walks, so as to form the whole into four, six, or eight principal divisions.

One or more of these divisions should be appropriated for the reception of all sorts of seeds, for raising plants to furnish the other parts; subdividing it into four feet wide beds, with foot-wide alleys at least between bed and bed. In these beds should be sown seeds, &c. of all such trees, shrubs, and herbaceous plants as are raised from seed; and which should

contain the various sorts of kernels and stones of fruit, to raise stocks for grafting and budding upon, as well as the seeds of forest-trees, ornamental trees, shrubs, &c. and of numerous herbaceous perennials, of the fibrous and bulbous-rooted tribes.

The season for sowing is both spring and autumn, according to the nature of the different sorts, as may be seen under their different heads. When the young tree and shrub seedling-plants thus raised are one or two years old, they should be planted out in Nursery-rows into the other principal divisions, but many kinds of herbaceous plants require to be picked out from the seed-beds when only from two to three or four months old. And, on the contrary, most kinds of bulbous seedlings will not be fit for planting out in less than one or two years at the shortest periods.

Another part of these grounds should be allotted for stools of various trees and shrubs, for propagation by layers, by which vast numbers of plants of different kinds may be raised. These should be strong plants set in rows three or four feet distance every way: such of them as naturally rise with tall stems, after being planted one year, are headed down near the ground, to force out many lower shoots conveniently situated for laying them down. See **STOOLS** and **LAYING**.

The cuttings, suckers, slips, off-sets, &c. of hardy trees, shrubs, and plants, may be planted out in any convenient part of the ground in shady borders, &c.; but for the more tender kinds, some warm sheltered situation should be provided.

The other principal divisions of these grounds should be left for the reception of various sorts of seedling plants from seminary quarters; as well as for those that are raised from suckers, layers, cuttings, &c. to be planted in rows from one to two or three feet asunder, according to their natures and growths, allowing the tree and shrub kinds treble the distance of the herbaceous perennial sorts. Of the tree and shrub kinds some are to be planted for stocks to graft and bud the select sorts of fruit-trees and other choice plants upon, that are usually propagated by such methods; others should be trained up entirely on their own roots without budding and grafting, as in most forest and other hardy tree kinds; as well as almost all the sorts of shrubs.

It is also proper to have some dry warm sheltered situation in the full sun in these grounds, for occasional hot-beds of dung or tan, for raising and forwarding many sorts of tender or curi-

ous exotics by seed, cuttings, suckers, slips, &c. which should be furnished with suitable frames and lights, hand-glasses, garden-mats, and other requisites for that sort of culture.

Methods and Times of Stocking with Plants. The particular modes of cultivation are fully explained under the different heads of the plants, and the operations that are necessary in raising them to the best advantage.

As to the seasons for performing the works of sowing, planting, &c. they are different in different kinds, but the autumn and spring are the principal seasons: for planting out or removing, the principal season is about October and in April, for tender kinds, especially the evergreen tribe; but most other hardy trees and shrubs may be transplanted any time in winter, in open mild weather. The nature of the soil should, however, be regarded in this business.

The hardy herbaceous fibrous-rooted plants may be removed almost any time, either in autumn or spring, and many sorts even in the summer. But for the older or larger plants, the autumn or very early spring are the best periods, which are the only proper seasons for dividing or slipping the roots of all these kinds for further increase.

And for the bulbous and such tuberous roots whose leaves, like most of the bulbous tribe, decay in the summer, the proper season for planting or removing them is the spring and summer months, when their flower-stalks decay, as well as to separate their off-sets for increase; which may either be planted again directly, or kept out of ground one, two, or several months, though it is proper to plant the principal part again in autumn, unless where retained for sale, &c.

The succulent perennial sorts may be removed almost any time in the spring, summer, or early autumn, but the last is the best. But most kinds of succulent cuttings succeed best when planted in the summer season.

Methods of disposing the Plants.—In the distribution of the different sorts in these grounds, each should be separate: the fruit-forest-trees, &c. occupying spaces by themselves nearly together; all the shrub kind should also be ranged in separate places, allotting suitable spots for herbaceous perennials and tender plants, defended with yew or privet hedges, or a reed fence, &c. in which may be set such plants, in pots, as are a little tender whilst young, and require occasional shelter from frost, but not so tender as to require to be housed as green-house plants, &c. And in such places, frames of various sizes may be placed, either to be covered occasionally with glass lights, or

with mats, to contain some of these more choice tender kinds in pots, to be nursed a year or two, or longer, with occasional shelter, till gradually hardened to bear the open air.

The arrangement of all the sorts in the open grounds should always be in lines or nursery-rows, as already suggested; placing the fruit-tree stocks, &c. for grafting and budding upon, in rows two feet asunder, when for dwarfs; but for standards two feet and a half, and a foot and a half in the lines. But as after being grafted and budded they become fruit-trees, &c. where they are to stand to grow to any large size, they should be allowed the width of a yard between the rows. Forest-trees should also be placed in rows from two to three feet asunder, and half that distance in the rows; varying the distance both ways, according to the time they are to stand: the shrub kind should likewise be arranged in rows about two feet asunder, and fifteen or eighteen inches distant in each line; and as to the herbaceous plants, they may generally be disposed in four-feet-wide beds, or large borders, in rows, or distances, from six to twelve or eighteen inches asunder, according to their nature of growth, and time they are to stand or remain in them.

By this mode of arrangement, a great number of plants are included within a narrow compass, but which is sufficient, as they are only to remain a short time; and besides, they are more readily kept under proper regulation.

In public grounds of this sort, many kinds of seedling-trees and shrubs are planted out often in much closer rows at first than these, not only in order to husband the ground to the best advantage, but by standing closer it encourages the stem to shoot more directly upward, and prevent their expanding themselves much any where but at top; as for instance, many sorts of ever-greens that are of slow growth the first year or two, such as the pine-trees, firs, and several others; which the nursery-gardeners often prick out from the seminary, first into four feet-wide beds, in rows lengthways, six inches asunder; and after having one or two years growth here, transplant them in rows a foot asunder; and in a year or two after, give them another and final transplantation in the Nursery, in rows two or three feet asunder, as above: these different transplantings encourage the roots to branch out into many horizontal fibres, and prepare them better for being finally planted out.

The various sorts of Nursery-plants, after being raised in some of the above methods, are sometimes pricked out by dibble, in other

cases put in by the spade, either by trenches, slitting-in, trenching, or holing; and some are drilled in by a spade or hoe, according to the kinds.

Sometimes young seedling-trees and shrubs are pricked out from the seminary by dibble; sometimes put in by the spade in the following methods: first, having set a line to plant by, the spade is stricken into the ground with its back close to the line, and another stroke given at right angles with it; then a plant set into the crevice made at the second stroke, bringing it close up into the first-made crevice even with the line, pressing the mould close to it with the foot; then proceeding to plant another in the same way, and so on.—A second method, for plants with rather larger roots, is to strike the spade down with its back close to the line, and then cut out a narrow trench with it close along the line, making the side next the line perfectly upright, placing the plants upright against the back of the trench close to the line, at the proper distances; and as the work proceeds, trimming in the earth upon their roots: when one row is thus planted, the earth should be trodden gently all along close to the plants; and then proceed to plant another row in the same manner. Another method of planting out small tree and shrub plants is, after having set the line as above, to turn the spade edgewise to the line, casting out the earth of that spit, then a person ready with plants, setting one in the cavity close to the line, and directly taking another such spit, turning the earth in upon the roots of the plant, and then placing another plant into the second cut, covering its roots with the earth of a third spit, and so on to the end: but sometimes, when the roots are much larger, holes are made along by the line wide enough to receive the roots freely every way, covering them in as above, as the work proceeds, always pressing the earth gently with the foot close to the roots, and closing it about the stems, to settle the plants firmly in their proper positions.

Fibrous-rooted herbaceous plants are mostly planted with a dibble, except when the roots are large and spreading, or such as are removed with balls of earth; when they are more commonly planted by holing them in with a garden trowel, or small spade for the purpose.

But bulbous and tuberous-rooted plants, such as lilies, tulips, anemones, ranunculuses, &c. are commonly planted with a dibble, and many sorts may be planted in drills drawn with a hoe.

They are also sometimes planted, by raking or trimming the earth from off the top of the beds

from about three to four or five inches deep, into the alleys, then placing the roots in rows upon the surface, thrusting the bottoms a little into the ground, and immediately covering them with the earth which was drawn off into the alleys, spreading it evenly over every part, so as to bury all the roots to an equal depth in the soil.

The tender kinds of exotic plants, that require occasional shelter whilst young, should many of them be potted, in order for moving to warm situations in winter; or some into frames, &c. to have occasional shelter from frost, by glasses or mats, as they may require; hardening them, however, by degrees to bear the open air fully in the Nursery the year round. And the most tender kinds, that require the aid of a greenhouse or stove, should all be potted, and placed in their proper situations. See GREEN-HOUSE and STOVE PLANTS.

General Culture of the Plants.—In the management of the various hardy Nursery-plants, those intended as stocks or fruit-trees, should have their stems generally cleared from lateral shoots, so as to form clean straight stems, but never to shorten the leading shoot, unless it is decayed, or becomes very crooked, in which case it may be sometimes proper to cut it down low in spring, to shoot out again, training the main shoot for a stem, with its top entire, till grafted or budded. See GRAFTING, BUDDING, and TRAINING.

But in the culture of the fruit-tree kind, the sorts designed for principal wall-trees, particularly such as peaches, nectarines, apricots, &c. should, when of one year's growth from grafting and budding, be planted against some close fence, as a wall, paling, reed-hedge, &c. and their first graft or bud-shoot headed down in the spring, to promote an emission of lower lateral shoots and branches, in order to be regularly trained to the fence in a spreading manner for two or three years, or till wanted, to form the head in a regular spreading growth, which in public grounds of this kind should always be ready in proper training, to supply those who may wish to have their walls covered at once by such ready trained trees. And a similar training, both for wall and espalier fruit-trees, may be practised with some principal sorts in the Nursery-rows in the open quarters of the ground, by directing their branches, in a spreading manner, to stakes placed for the purpose.

Standard fruit-trees should only be trained with a clean single stem, five or six feet for full standards, by cutting off all lateral shoots arising below: half-standards should be trained

Vol. II.

with three- or four-foot stems, and dwarf standards in proportion by the same means.

The heads of the standards in some may be directed by having the first immediate shoots from the graft or bud, when a year old, pruned short in spring, to procure lateral shoots, in order to form a fuller spread of branches, proceeding regularly together from near the summit of the stems, and thus give a more regular branchy growth to them.

Forest-trees should, in general, be encouraged to form straight clean single stems, by occasional trimming off the largest lateral branches, which also promotes the leading top-shoots in rising straight, and faster in height; always suffering that part of each tree to shoot at full length; that is not to top it, unless where the stem divides into forks, when the weakest should be trimmed off, and the straightest and strongest shoots or branches left to shoot out at their proper length to form the aspiring tops.

The different sorts of shrubs should mostly be suffered to branch out in their own natural way, except merely regulating very disorderly growths; and some sorts may be trained with single clean stems, from about one foot to two or three high, according as may be thought proper. But shrubs in general appear the most agreeable when permitted to shoot out laterally all the way, so as to be branchy or feathered to the bottoms of the stems.

The fruit-trees in each species should, as soon as grafted or budded, have all the different varieties numbered, by placing large flat-sided sticks at the ends of the rows, for which purpose the spokes of old coach-wheels, or any thing about that size of any durable wood, answers very well, painting or marking upon them the numbers, and entering them in the Nursery-book, with the name of the varieties to which the number-sticks are placed; by which, at all times, a ready recourse may be had to the sorts wanted.

And it is useful to employ the same means to trees, shrubs, and herbaceous plants, especially the varieties of particular species, when they are numerous, such as in many of the flowery tribes; as auriculas, carnations, tulips, anemones, ranunculuses, &c.

Watering Nursery-plants is very requisite in dry hot weather, in spring and summer; such as seed-beds and tender seedling-plants, while young, and when first planted out, till they have taken good root; also, occasionally, to new-laid layers and newly-planted cuttings in dry warm weather; but as to hardy trees and shrubs of all sorts, when planted out at the proper time, as not too late in the spring, no great regard need be paid

X

in this respect, as they generally succeed very well without.

The next business is, in every winter or spring, to dig the ground between the rows of all sorts of transplanted plants in the open Nursery-quarters, a practice which is particularly necessary to all the tree and shrub kinds that stand wide enough in rows to admit the spade between them; this work is by the Nursery-men called *turning-in*; the most general season for which is any time from October or November until March; but the sooner it is done the more advantageous it will be to the plants. The ground is to be dug only one spade deep in these cases, proceeding row by row, turning the top of each spit clean to the bottom, that all weeds on the top may be buried a proper depth. It is a most necessary annual operation, both to destroy weeds, and to increase the growth of the young plants.

And in the summer season great attention is necessary to keep all sorts clean from weeds; the seedlings growing close in the beds must be hand-weeded; but among plants of all sorts that grow in rows wide enough to admit the hoe, it will prove not only most expeditious, but, by loosening the top of the soil, promote the growth of all kinds of plants. It should always be performed in dry weather, and before the weeds grow large. See HOB and HOBBING.

As soon as any quarter or part of these grounds are cleared from plants, others must be introduced in their room from the seminary; the ground being previously trenched over for the purpose, giving it the addition of manure if necessary.

It is supposed by some to be of advantage to plant the ground with plants of a different kind from those which occupied it before; but this is probably not very material.

The tender or exotic plants of all kinds that require shelter only from frost whilst young, and by degrees become hardy enough to live in the open air, should, such of them as are seedlings in the open ground, have the beds arched over with hoops, or rods, at the approach of winter, in order to be sheltered with mats in severe weather; and those which are in pots, either seedlings or transplanted plants, should be removed in October in their pots to warm sunny situations sheltered with hedges, &c. placing some close under the fences facing the sun, where they may have occasional covering of mats in frosty weather; others that are more tender being placed in frames, to have the occasional covering either of glass-lights or mats, &c. observing that they are gradually to be hardened to the

open ground, and need only be covered in frosty weather; at all other times they should remain fully exposed, and, by degrees, as they acquire age and strength, become inured to bear the open air fully; so as when they arrive at from two or three to four or five years old, they may be turned out into the open ground.

The stove and green-house kinds must be managed according to the directions given under these heads. See GREEN-HOUSE PLANTS.

NUT, BLADDER. See STAPHYLÆA.

NUT, CASHEU. See ANACARDIUM.

NUT, COCOA. See COCOS.

NUT, MALABAR. See JUSTICIA.

NUT, PHYSIC. See JATROPHA.

NUT-TREE. See CORVLUS.

NYCTANTHES, a genus containing plants of the shrubby exotic flowering kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariæ*.

The characters are: that the calyx is a one-leaved perianthium, tubular, truncate, quite entire, permanent: the corolla one-petalled, salver-shaped: the tube cylindric, the length of the calyx: border five-parted, spreading, with the lobes two-lobed: the stamina have two filaments in the middle of the tube, very short: anthers oblong, the length of the tube: the pistillum is a superior germ, subovate: style filiform, the length of the tube: stigmas two, acute: the pericarpium is an obovate capsule, compressed, with an emarginate dagger-point, coriaceous, two-celled, bipartile: cells parallel, appressed, valveless: the seeds are solitary, obovate, convex on one side, flat on the other, fastened to the bottom of the cell.

The species cultivated is: *N. arbor tristis*, Square-stalked Nyctanthes. Other species may be cultivated for variety.

It is a shrub, with four-cornered, rugged branches: the leaves are opposite, petioled, ovate, oblong, quite entire, longer than the branch-joints, rugged on both sides: the peduncles axillary, opposite, solitary, four-cornered, shorter by half than the leaf, two-leaved at top, with three-flowered pedicels: the partial involucre four-leaved: the leaflets are obovate, the length of the calyxes, blunt, containing three sessile florets: the corolla funnel-shaped, with a six- or eight-cleft border: the capsule coriaceous, superior, obcordate or obovate, turgidly lenticular, in the twin, middle ventricose and marked with a longitudinal elevated streak, compressed at the sides into a narrow sharp margin, the rest brittle, two-celled, bipartile; with the segments plano-convex, of a brown chestnut

colour on the outside, pale within, quite entire, valvaceous. It is a native of the East Indies.

Culture.—It may be increased by layers and cuttings. The layers may be laid down in the early part of the summer, in the usual method, being made from the young branches, plunging the pots containing them in a bark hot-bed.

The cuttings should be taken from the young shoots, be planted out at the same time, and managed in the same manner.

The plants, when fully rooted in either way, may be removed into separate pots. They should have due supplies of water, and be pruned and removed into larger pots as there may be occasion.

They are very ornamental and fragrant among other potted tender plants.

NYMPHÆA, a genus comprising plants of the herbaceous flowery aquatic kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is an inferior perianthium, four-, five-, or six-leaved, large, coloured above, permanent; the corolla has numerous petals (often fifteen) placed on the side of the germ, in more than one row: the stamina have numerous filaments (often seventy) flat, curved, blunt, short: anthers oblong, fastened to the margin of the filaments: the pistillum is an ovate germ, large: style none: stigma orbiculate, flat, peltate-sessile, rayed, crenate at the edge, permanent: the pericarpium is a hard berry, ovate, fleshy, rude, narrowed at the neck, crowned at the top, many-celled, (cells from ten to fifteen) full of pulp: the seeds very many, and roundish.

The species are: 1. *N. lutea*, Yellow Water Lily; 2. *N. alba*, White Water Lily; 3. *N. Lotus*, Egyptian Water Lily; 4. *N. nelumbo*, Peltated Water Lily.

The first has the leaves smooth, plane, except that they turn up a little at the edge to keep off the water, tough and pliant, ten or twelve inches in diameter, floating, ovate or nearly orbicular, bright green above, paler underneath, with branched raised nerves or veins: the petioles are smooth, three-sided, their length depending on the depth of water, sometimes five feet and a half in length. The case is the same with the peduncle, which always elevates the flower above the water; but after it is impregnated, the seeds are ripened under water, and fall into the mud at bottom to produce new plants: the peduncles are round, succulent, and one-flowered: the flowers an inch and half in diameter, having

a vinous smell. It is a native of most parts of Europe, flowering in July and August.

The second species has a tuberous root, frequently the size of the human arm, creeping far and wide and deep in mud: the whole plant is larger in all its parts than the first: the leaves are much the same, only larger: the petioles and peduncles round, within full of pores, four of which are generally larger than the rest; hairs interwoven between: the flowers large, being sometimes six inches in diameter, very handsome and double.

According to Linnæus, the flower raises itself out of the water and expands about seven o'clock in the morning, and closes again, reposing upon the surface, about four in the evening. It is a native of most parts of Europe, flowering in July and August.

The third resembles the second very much in the form of the flower and leaves, but the latter are toothed about the edge. It is a native of the hot parts of the East Indies, Africa, and America, flowering about the middle of September near Cairo, in Lower Egypt. The Arabians call it Nuphar. A bread was formerly made of the seed when dried and ground.

The fourth species has a horizontal root, long, creeping, consisting of joints linked together, ovate-oblong, white, fleshy, esculent, tubular within: the leaves exactly peltate, with a cavity in the centre above, and dichotomous veins springing from the same centre, orbiculate, with a point on each side, a little waved, thin, paler underneath, smooth, of different sizes, from four to twelve inches: the petioles erect, very straight, round, hispid or muricated, thicker below, attenuated above: the peduncle the thickness of a finger below, attenuated above, spongy, muricated, one-flowered: the flowers as large as the palm of the hand, or larger, purple. It is a native of the Indies, &c.

The Chinese have the roots not only served up in summer with ice, but laid up in salt and vinegar for winter: the seeds are somewhat of the size and form of an acorn, and of a taste more delicate than that of almonds: the ponds in China are generally covered with it, and exhibit a very beautiful appearance when it is in flower; and the flowers are no less fragrant than handsome.

Culture.—The two first sorts may be best increased by procuring some of their seed-vessels just as they become ripe and ready to open, and throwing them into canals, ponds, ditches, or other standing waters, where the seeds, sinking to the bottoms, afford plants in the following spring floating upon the surface of their waters.

When they have been once fixed to the place in this way, they multiply greatly, so as to cover such places in a short time.

They are also capable of being cultivated in large troughs or cisterns of water, having earth at the bottoms, flourishing very well, and producing annually large quantities of flowers.

The third and fourth species, as being tender, should be kept in such troughs or cisterns, and be set in a corner of the stove. In their native situations they are increased both by their roots and seeds as the common sorts in this climate.

NYSSA, a genus containing a plant of the aquatic ornamental tree kind.

It belongs to the class and order *Polygamia Dioecia*, and ranks in the natural order of *Umbellales*.

The characters are: that in the male the calyx is a five-parted perianthium, spreading, with a plane bottom: there is no corolla: the stamina have ten awl-shaped filaments, shorter than the calyx: anthers twin, the length of the filaments: hermaphrodite—the calyx is a perianthium as in the male, sitting on the germ: there is no corolla: the stamina have five awl-shaped filaments, erect: anthers simple: pistillum is an ovate germ, inferior: style awl shaped, curved inwards, longer than the stamens: stigma acute: the pericarpium is a drupe: the seed is an oval nut, acute, scored with longitudinal grooves, angular, irregular.

The species are: 1. *N. integrifolia*, Mountain Tupelo; 2. *N. denticulata*, Water Tupelo.

The first rises with a strong upright trunk to the height of thirty or forty feet, and sometimes near two feet in diameter; sending off many horizontal, and often depending branches: the leaves are obovate, a little pointed, entire, of a dark green and shining upper surface, but lighter and a little hairy underneath: those of the male trees are often narrower and sometimes lance-shaped. The flowers are produced upon pretty long common footstalks, arising from the base of the young shoots, and dividing irregularly into several parts, generally from six to ten, each supporting a small flower, having a calyx of six or seven unequal leaves, and from six to eight awl-shaped spreading stamens, supporting short four-lobed anthers: the female trees have fewer flowers produced upon much longer simple cylindrical footstalks, thickened at the extremity, and supporting generally three flowers, sitting close, and having a small involucre. They are composed of five small oval leaves, and in the centre an awl-shaped incurved style, arising from the oblong germ, which is inferior, and becomes an oval oblong berry, of

a dark purplish colour when ripe: the timber is close-grained, and curled so as not to be split or parted; and therefore much used for wheels, &c. It grows naturally in Pennsylvania, and perhaps elsewhere.

The second species rises with a strong upright trunk to the height of eighty or a hundred feet in its native situation, dividing into many branches towards the top: the leaves are pretty large, of an oval-spear-shaped form, generally entire, but sometimes somewhat toothed, and covered underneath with a whitish down: they are joined to long slender footstalks, and affixed to the branches in somewhat of a verticillate order, presenting a beautiful varied foliage: the berries are near the size and shape of small olives, and are preserved as that fruit is by the French inhabitants upon the Mississippi, where it greatly abounds, and is called the Olive-tree: the timber is white, and soft when unseasoned, but light and compact when dry, which renders it very proper for making trays, bowls, &c. It grows naturally in wet swamps, or near large rivers, in Carolina and Florida.

Culture.—These trees may be increased by sowing the seeds procured from the places where they grow naturally, putting them into the ground as soon as they are procured, as they lie long before they vegetate.

They should be sown in pots filled with light loamy earth, placing them where they may have only the morning sun; and during the first summer the pots should be kept clean from weeds, being well watered in dry weather. The pots should be plunged into the ground in the following autumn; and, if the winter prove severe, cover them with old tan, peas-haulm, or other similar light covering. And in the following spring they should be plunged into a moderate hot-bed, hooped and covered over with mats; keeping the earth constantly moist.

By this means the plants are brought up in the spring, when they should be gradually hardened to bear the open air; and during the following summer, the pots again plunged into an eastern border, watering them in dry weather, carefully removing them into a frame in the autumn, where they may be screened from frost; but in mild weather be exposed to the open air. In the spring following, before they begin to shoot, they should be parted carefully, planting each in a small pot filled with loamy mould; and when they are plunged into a moderate hot-bed, it will promote their putting out new roots; after which they may be plunged in an eastern border, and be sheltered again in winter under a frame. In the third spring, such plants as have made

the greatest progress may be planted out in a loamy soil, in a sheltered situation, where they may be capable of enduring the cold of this climate. They make the greatest progress where the soil is inclined to be moist.

They may likewise be propagated by layers

and cuttings, planted out in the autumn or spring in the usual manner.

The plants afford ornament and variety in shrubbery and other parts, where the ground is of a moist quality.

O C I

OAK. See **QUERCUS**.
OAK JERUSALEM. See **CHENOPODIUM**.
OCIMUM, a genus containing plants of the tender herbaceous aromatic annual kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved perianthium, two-lipped, very short, permanent: upper-lip flat, orbiculate, wider, ascending: lower-lip four-cleft, acute, converging: the corolla is one-petalled, ringent, resupine: tube very short, spreading; one lip turned upwards, wider, half-four-cleft, blunt, equal; the other lip turned downwards, narrower, entire, serrate, longer: the stamina have four filaments, declined; two a little longer, and two putting forth a reflex process at the base: anthers half-mooned: the pistillum is a four-parted germ: the style filiform, situation and length of the stamens: stigma bifid: there is no pericarpium: calyx closed, cherishing the seeds: the seeds four, ovate.

The species cultivated are: 1. *O. Basilicum*, Common Sweet Basil; 2. *O. minimum*, Bush Basil; 3. *O. tenuiflorum*, Slender-spiked Basil.

The first has the stem suffruticose, three feet high (a foot and half), erect, round, tomentose; with straight, ascending branches: the leaves somewhat acute, serrate, pubescent, brownish-red, waved, petioled, smelling like cloves: the flowers are white, small, in long, upright, terminating spiked racemes. The whole plant has a strong scent of cloves. It is a native of the East Indies, flowering in July and August.

There are varieties with purple fringe-leaves; with green fringe-leaves; green with studded leaves; and the Large-leaved Basil.

The middle-sized variety, or that which is used in the kitchen, especially in French cookery, rises about ten inches high, sending out opposite, four-cornered branches from the very bottom:

O C I

the leaves are ovate-lanceolate, ending in acute points, indented on their edges. The whole plant is hairy, and has a strong scent of cloves, which to some is very agreeable.

The chief sub-varieties of which are: the Common Basil, with very dark green leaves and violet-coloured flowers; the Curled-leaved Basil, with short spikes of flowers; the Narrow-leaved Basil, smelling like fennel; the Middle Basil, with a scent of citron; the Basil with studded leaves; and Basil with leaves of three colours.

The second species is a low bushy plant, seldom more than six inches high, branching from the bottom, and forming an orbicular head: the leaves small, smooth, on short footstalks: the flowers in whorls towards the top of the branches, smaller than those of the first sort, and seldom succeeded by ripe seeds in this climate. It is a native of the East Indies, annually flowering in July and August.

There are varieties with black purple leaves, and with variable leaves.

The third has the stem from one to two feet high, roundish, purple, brachiate, having spreading hairs scattered over it: the branches shorter: the leaves bluntly serrate, soft, on long petioles: the spikes terminating, in threes, long, narrow, peduncled; with opposite, smooth, bractes, closely reflex: the flowers three from each bracte, subsessile, which are so small as scarcely to be visible to the naked eye: they begin to open from the top of the spike. It is a native of Malabar, &c.

Culture.—They are all capable of being increased by sowing the fresh seeds in the latter end of March, upon a moderate hot-bed, covered to the depth of five or six inches with good light mould, putting them in a quarter of an inch deep, fresh air being given daily, and slight waterings occasionally. When the plants have attained a few inches in growth they should be pricked out upon another hot-bed four inches apart, or set in pots

of a small size, plunging them in the hot-bed, water and occasional shade being given till fresh rooted, with fresh air and water in small proportions afterwards. In the latter end of the spring or beginning of summer, they should be begun to be hardened, and in the hot weather set out in the open air where wanted. Some may be set out in the borders in the open ground, a slight watering being given at the time.

In order to obtain good seeds, a few of the potted plants should be placed in a good greenhouse or glass case in the latter end of the summer, fresh air being freely admitted.

The first sort and varieties are often used as culinary herbs, and all the sorts may be set out among other potted plants in rooms and windows, especially the bush sort, as well as in the borders and clumps for ornament and variety.

OENOTHERA, a genus containing plants of the herbaceous, biennial, perennial and under shrubby perennial kinds.

It belongs to the class and order *Octandria*, *Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leaved, superior, deciduous perianthium: tube cylindrical, erect, long, deciduous: border four-cleft: the segments oblong, acute, bent down: the corolla has four petals, obcordate, flat, inserted into the interstices of the calyx, and the same length with the divisions of the calyx: the stamina have eight awl-shaped filaments, curved inwards, inserted into the throat of the calyx, shorter than the corolla: anthers oblong, incumbent: the pistillum is a cylindrical germ, inferior: style filiform, the length of the stamens: stigma four-cleft, thick, blunt, reflex: the pericarpium is a cylindrical capsule, four-cornered, four-celled, four-valved, with contrary partitions: the seeds very many, angular, naked: the receptacle columnar, free, four-cornered, with the angles contiguous to the margin of the partitions.

The species cultivated are: 1. *O. biennis*, Broad-leaved Tree-Primrose; 2. *O. longiflora*, Long-flowered Tree-Primrose; 3. *O. mollissima*, Soft Tree-Primrose; 4. *O. fruticosa*, Shrubby Tree-Primrose; 5. *O. pumila*, Dwarf Tree-Primrose.

The first has a biennial fusiform fibrous root, yellowish on the outside, white within: from this, the first year, arise many obtuse leaves, which spread flat on the ground; and from among which, the second year, the stems come out, three or four feet high, upright, of a pale green colour, the thickness of a finger, not hollow but pithy, angular, slightly pubescent and rugged, tinged with purple, especially towards the bottom, branched alternately almost from the ground:

the root-leaves run down into a three-sided petiole an inch in length: the stem-leaves sessile, bright lightish green, pubescent on both sides, waved a little about the edge, and having a few small teeth near the base: they are from five to seven inches in length and two inches in breadth, having a considerable midrib running the whole length, very wide and tinged with purple towards the base, at the back very prominent, with white nerves springing from it, and curved towards the point: the flowers are produced all along the stalks on axillary branches, and in a terminating spike: the leaves on the former are similar to the stem-leaves, but much smaller, being not more than two inches long, and little more than half an inch in breadth: the flowers are solitary, each being separated by a leaflet or bracte, wider in proportion at the base than the proper leaves, and drawn more to a point, diminishing gradually towards the top of the spike, till they become linear, scarcely half an inch in length, and a line in breadth.

It is observed that the flowers usually open between six and seven o'clock in the evening, whence the plant is called Evening or Night-Primrose: the uppermost flowers come out first in June, the stalk keeping continually advancing in height, and there is a constant succession of flowers till late in autumn. It is a native of North America. The roots are said to be eaten in some countries in the spring season.

The second species has also a biennial root: the root-leaves are numerous, broad-lanceolate, toothletted, pubescent, with a white rib, obliquely nerved: the stems usually five, springing out below the root-leaves, quite simple, ascending, rough-haired, green with long spreading white hairs: the central stem grows up later: the stem-leaves are ovate-oblong, sessile, like the root-leaves: the flowers axillary from the upper leaves, with the germ and calyx hairy. It is remarked by Curtis, that luxuriant specimens exceed five feet in height, that the flowers are uncommonly large and showy, and continue blowing from July to October. It is a native of Buenos Ayres.

The third has a shrubby stalk more than two feet high, hairy, with narrow-lanceolate sessile leaves, a little waved on their edges, and ending in acute points: the flowers are axillary like the other sorts, at first pale yellow, but as they decay changing to an orange colour, smaller than those of the first sort: the seed-vessels slender, taper, hairy. It is also a biennial plant, and a native of Buenos Ayres, flowering from June to October.

The fourth species is a perennial, but altogether herbaceous, at least here, and therefore



Painted by Syd. Edwards

London Published Aug 1st 1865, by G. B. Kearsey, Fleet Street

Engraved by F. V. C. Vigneron

Oenothera fruticosa
 1 Shubby *oenothera*

Origanum dictamnus
 2 Dittany of Crete

improperly named *fruticosa*: the flowers which are large and showy, though they open in the evening, remain expanded during most of the ensuing day: the flower-buds, germ, and stalk, are enlivened by a richness of colour which contributes to render this species one of the most ornamental and desirable. It is a native of Virginia.

The fifth has also a perennial fibrous root: the lower leaves ovate, small, close to the ground: the stalk slender, near a foot high: the leaves smaller, light green, sessile, ending in blunt points: the flowers small, bright yellow: it sends up many flowering-stems, producing blossoms from April to July, opening in the morning as well as evening. It is a native of North America.

Culture.—These plants are all capable of being raised from seeds, and some of them by parting the roots and cuttings.

The seed should be sown either in the autumn or early spring, in the first and third sorts, upon a bed or border in the open ground, thinning and watering the plants properly, and keeping them free from weeds till the following autumn, when they may be removed with balls of earth about their roots to the places where they are to remain. Or some may be set out at the time of thinning in nursery-rows, six inches apart.

They also rise without trouble from the scattering of the seeds.

In the second sort, the seed should be put into the ground in the open borders or other parts, about the latter end of March, where the plants are to remain. One plant is sufficient in a place, which should have a stick set to support its branches when they have advanced a little.

The fourth sort may be readily increased by sowing the seeds as above, and by parting the roots and cuttings of the young branches, planting them out in the open borders or other places where they are to grow in the autumn, for the first method, and the spring for the latter, giving water as there may be occasion.

In the fifth sort, the seeds should be sown in pots of light earth in the autumn, plunging them in a hot-bed frame during the winter. When the plants have attained proper growth in the spring, they should be removed into separate pots, which should be protected in the following winter under a garden frame. And some may be planted out in the open ground, where they often succeed in mild winters.

The parted roots should be planted out in the spring, either in pots or the open ground.

The plants raised from seed are in general the best, as flowering more strongly.

By cutting down the stems of the plants in the first year of their flowering before they perfect their seeds, the plants may sometimes be rendered more durable.

The first two sorts, as has been seen, are biennial, and the others perennial; the former should of course be raised annually.

They are all proper for affording ornament and variety, either in the open ground or among other potted plants. The second and third sorts are often considered as green-house plants, but they succeed well in the open ground.

OFF-SET, a sort of sucker or small young plant, issuing from the sides of the main root of different sorts of perennial plants, whether bulbous-, tuberous-, or fibrous-rooted, by means of which they are often readily increased.

The method of increasing by Off-sets is applicable in general for all sorts of bulbous- and tuberous-rooted perennial plants, such as tulips, anemones, &c. in which there are small bulbs, or tubers, that on being planted out afford plants of exactly the same kind as those from which they are taken, and which, after having one or two years' growth, flower, produce seed, and furnish a supply of Off-sets in their turn.

In the vast tribe of fibrous-rooted perennial plants, most sorts afford a progeny of this sort, for propagating and perpetuating their respective species and varieties, both in the flowery kind, &c., and in some esculents, but more considerably in the former; by which numerous sorts of the most beautiful flowering perennials are multiplied.

Off-sets are therefore not only an expeditious and certain method of propagation, but by which there is a certainty of having the desired sorts continued, whether species or particular varieties.

They have this advantage over seedlings, that the plants of the flowery kind often flower in one year; whereas seedling plants of the bulbous kinds are frequently four, five, and sometimes six or seven years before they flower in perfection. By seedlings new varieties are principally gained, the roots of which furnishing Off-sets by which they are increased.

The separating Off-sets may be performed in some sorts every year, in others once in two or three years, according to the sorts, and the increase of Off-sets afforded by the main roots.

The proper seasons for separating or taking them off, in the bulbous- and many tuberous-rooted plants, are chiefly summer and autumn, when they have done flowering, and the leaves are decayed, as at that period the roots of these sorts, having had their full growth, assume an

inactive state, drawing little nourishment from the earth for a few weeks. It is also the only proper period for moving all the bulbous kinds in particular, both to separate Off-sets and transplant the main roots, or to take them up for keeping for a while. See BULB.

The roots should be taken up in dry weather if possible, and all the Off-sets separated singly from the main bulb, &c. planting them in nursery-beds, in rows six inches asunder, by dibble, or in drills two or three inches deep, or in any other method that may be suitable. They should remain a year or two, according to their size, in this situation to get strength; then be transplanted, at the proper season, where they are to continue, managing them as other bulbous- and tuberous-rooted plants. See BULB and TUBER.

The Off-sets of fibrous-rooted perennial plants, may either be slipped off from the sides of the main roots as they stand in the ground, or the roots may be wholly-taken up, and parted into as many slips as there are Off-sets properly furnished with fibres.

In this sort the proper season is autumn, when their stalks decay, or early in spring, before new ones begin to shoot forth; though some hardy sorts may be slipped any time in open weather from the autumn to the early spring, and others almost any time when they occur; planting them by dibble, the smaller ones in nursery-beds, in rows six or eight inches asunder, to have a year's growth; and the larger ones at once where they are to remain.

In several sorts of under-shrubby perennial plants that are capable of being increased by Off-sets from the bottoms, the proper season for taking them off is the autumn and spring, or in the hardy kinds any time in open weather, during the autumn or early spring, planting them in nursery-rows for a year or two, or till of proper size for the purposes they are designed for.

The Off-sets of succulent plants should generally be slipped off in summer, and, previous to planting those of the tender kinds, be laid on a dry shelf for some days, till the moisture at bottom is dried up; then planted in pots of dry soil, and managed according to their different kinds and habits of growth. See SUCCULENT PLANTS.

Off-sets are never produced from annual plants of any kind.

The particular management that is requisite in the different kinds is fully explained under the Culture of the plant to which it belongs.

OIL-TREE. See RICINUS.

OLD-MAN'S-BEARD. See CLEMATIS.

OLEA, a genus containing plants of the exotic tree kind. The Olive Tree.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiaria*.

The characters are: that the calyx is a one-leaved perianthium, tubular, small, deciduous: mouth four-toothed, erect: the corolla one-petalled, funnel-form: tube cylindrical, the length of the calyx: border four-parted, flat: segments subovate: the stamina have two, opposite, awl-shaped filaments, short: anthers erect: the pistillum is a roundish germ: style simple, very short; stigma bifid, thickish, with the clefts emarginate; the pericarpium is a sub-ovate drupe, smooth, one-celled: the seed is a nut, ovate-oblong and wrinkled.

The species cultivated are: 1. *O. Europæa*, Common European Olive; 2. *O. Cupensis*, Cape Olive; 3. *O. Americana*, American Olive; 4. *O. fragrans*, Sweet-scented Olive.

The first grows naturally in woods in the South of France, Spain, and Italy, and is therefore not cultivated: the leaves are much shorter and stiffer than those of the cultivated Olive: the branches are frequently armed with thorns, and the fruit is small and of little use.

There are several varieties; as the Warty Olive, which is a native of the Cape. The Long-leaved, which is chiefly cultivated in the South of France, and from which they make the best oil. The young fruit is the most esteemed when pickled.

There are several sub-varieties. The Broad-leaved, which is chiefly cultivated in Spain, where the trees grow to a much larger size than the preceding; the leaves are much larger, and not so white on their under side: the fruit is near twice the size of the Provence Olive, but of a strong rank flavour, and the oil is likewise strong.

There are also other varieties; as the narrow-leaved, short hard-leaved, shining-leaved, African, Lucca, &c.

It is observed that the Olive seldom becomes a large tree; but two or three stems frequently rise from the same root, from twenty to thirty feet high, putting out branches almost their whole length, covered with a gray bark: the leaves are stiff, about two inches and a half long, and half an inch broad in the middle, gradually diminishing to both ends, of a lively green on their upper side and hoary on their under, standing opposite: the flowers are produced in small axillary bunches; they are small, white, and have short tubes spreading open at top: the fruit is a su-

perior-berried drupe, of an oblong spheroidal form, and of a yellowish green colour, turning black when ripe.

The usual method of making oil from Olives in Italy is, to crush the fruit to a paste with a perpendicular mill-stone running round a trough; which is then put into flat round baskets, made of rushes, piled one upon another under the press: after the first pressure, scalding water is poured into each basket, its contents stirred up, and the operation repeated till no more oil can be skimmed off the surface of the tubs beneath: but this is not a good method; the oil is seldom pure, keeps ill, and soon grows rancid: but by another process, which is that of pounding the fruit in a mortar, the crushed substance being then thrown into a long woollen bag, and rubbed hard upon a sloping board, and then wrung, adding afterwards hot water, and continuing to press as long as a drop of oil can be drawn, the work is much more effectually performed.

The unripe Olives when pickled, especially the Provence and Lucca sorts, are to many extremely grateful, and supposed to excite appetite and promote digestion. According to Miller they are prepared by repeatedly steeping them in water; to which some add alkaline salt or quick-lime, in order to shorten the process; after which they are washed, and preserved in a pickle of common salt and water, with sometimes the addition of an aromatic.

The best salad oil is of a bright pale amber colour, bland to the taste, and without the least smell.

It has been observed that, with a little protection in severe frost, the Olive-tree may be maintained against a wall about London, but that in Devonshire there are some of these trees which have grown in the open air many years, and are seldom injured by frost, yet the summers are not warm enough to bring the fruit to any great perfection.

The second species is a small tree, or rather shrub, not branching much: the trunk straight, with many joints; bark subhirsute, blackish brown, with ash-coloured dots and lines: the leaves conjugate, decussate, sometimes sinuated at the end, but commonly entire, dense, and rigid, moderately concave, paler or deeper green, but always paler underneath, with oblique smooth veins, less conspicuous underneath than above: from the axils and at the end of the branches the flowers come out in racemes in June and July, sometimes thinly disposed, but sometimes so numerous that the racemes hang down. It is a native of the Cape.

The third has the leaves opposite, evergreen,
VOL. II.

petioled, shining: the racemes short, axillary, brachiate, with opposite pedicels: the segments of the corolla revolute: the style so short as to be scarcely any: the stigma bifid: the drupe globular, even, handsome: the nut obovate, substriated, perforated at the base: and there are male and female flowers on the same plant with the hermaphrodites. It is a native of Carolina and Florida, flowering in June.

The fourth species is a large tree in its native situation, the branches and branchlets trichotomous, obscurely four-cornered, smooth: the leaves decussate, oblong, sharp, a little bent back at the edge, parallel-nerved, reticulated, smooth, deep green above, paler underneath, spreading, frequent on the branchlets, a finger's length: the petioles semicylindric, grooved, smooth, a quarter of an inch in length: the flowers on the branchlets, aggregate in umbels, about six or eight together; peduncles filiform, one-flowered, smooth, half an inch in length: the flowers are very sweet-scented. It is a native of China, &c., flowering in July and the following month.

Culture.—These plants may be propagated in this climate by layers, which should be made from the young branches in the spring, in the usual manner, and be occasionally watered during the summer season, when in the autumn following they may be taken off and be planted in separate pots, being duly watered and placed in proper shade till fresh rooted, removing them in the beginning of the autumn into the shelter of the green-house. The layers sometimes, however, require two summers before they become perfectly rooted.

It is notwithstanding the best method to purchase plants of this sort, which are annually sent to the Italian warehouse-men in London, of pretty large sizes, with orange and other trees, as they are very tedious in raising from layers.

These plants, after being thus procured, and cleaned from filth by soaking their roots in water, should be planted in pots filled with fresh sandy light earth, plunging them in a moderate hot-bed, shading them in the hot sun, and refreshing them occasionally with slight waterings as the earth in the pots becomes dry. When they begin to shoot they should have air admitted pretty freely in proportion to the weather, being afterwards inured to the open air in a place defended from winds, removing them in the beginning of autumn into the green-house.

When they have in this management acquired strong roots, they may be removed with earth about them, and be planted out in the open ground in a dry warm situation, being managed as myrtles and other similar plants. When

covered by mats in the winter frost, great care must be taken to prevent their becoming mouldy, by not letting them remain covered too long, without the air being admitted.

They flower and produce fruit sometimes in two or three years.

They all afford variety among other greenhouse plants as well as in other situations.

OLIVE. See OLEA.

ONONIS, a genus containing plants of the shrubby kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a five-parted perianthium, almost the length of the corolla: segments linear, acuminate, slightly arched upwards; the lowest under the keel: the corolla is papilionaceous: banner cordate, striated, depressed at the sides more than the other petals: wings ovate, shorter by half than the banner: keel acuminate, as long as or longer than the wings: the stamina have ten filaments, connate in an entire cylinder: anthers simple: the pistillum is an oblong germ, villose: style simple, rising: stigma blunt: the pericarpium is a rhomb-shaped legume, turgid, subvillose, one-celled, two-valved, sessile: the seeds few and kidney-form.

The species principally cultivated are: 1. *O. Natrix*, Yellow-flowered Shrubby Rest-harrow; 2. *O. tridentata*, Three-tooth-leaved Rest-harrow; 3. *O. fruticosa*, Shrubby Rest-harrow; 4. *O. rotundifolia*, Round-leaved Rest-harrow.

There are other species both of the annual and perennial kinds, that may be cultivated for variety.

The first is a very strong-smelling plant, with a resinous odour, and not very clammy: the leaves oval, flattish, serrate only at the top, not fleshy: the peduncle the length of the awn: root large and wrinkled: the stems more or less upright, commonly a foot high: leaflets oblong, villose, toothed at the end: the flowers large, yellow, solitary, on a peduncle elbowed at two-thirds of its length, whence springs a thread like an awn: the upper part of the flower is rayed with red lines: legumes oblong and villose. It is a native of the South of France, &c.

The second species has erect shrubby stalks, a foot and a half high, dividing into slender branches very full of joints: the leaflets are narrow, thick, fleshy, on short footstalks: the flowers at the ends of the branches in loose panicles, some of the peduncles sustaining two and others but one flower: they are of a fine purple colour, and appear in June; the seeds

ripening in September. It is a native of Spain and Portugal.

The third species is a very beautiful low shrub, rising with slender stalks about two feet high, dividing into many branches: the flowers come out in panicles at the ends of the branches upon long peduncles, which for the most part sustain three large purple flowers: the legumes are turgid, about an inch long, hairy, inclosing three or four seeds. It is a native of the South of France, flowering in May and June.

It varies with white flowers.

The fourth has the stem round, striated, somewhat villose, a foot and half or two feet in height: the leaves are petioled, serrate-toothed, with the teeth alternately larger and smaller, villose, large; the end leaflet larger and rounder than the others: the stipules green, sheathing, absolutely serrate, with longitudinal prominent nerves: the flowers form handsome bunches at the ends of the branches; they are on a long peduncle, frequently three together, each on its proper pedicel, of a purple colour. It is a native of Switzerland, flowering from May to July.

Culture.—These plants may be increased by seeds, cuttings, and slips, according to the different kinds.

The seeds of the first sort should be sown upon beds of light earth in the early spring, as about April, thinly in drills, when they should be properly thinned out during the summer months, and kept perfectly free from weeds; when in the beginning of the autumn they may be removed into the places where they are to remain. It may likewise be increased by cuttings planted out at the same time.

Though this sort is pretty hardy when the winters are not very severe, a few plants should always be kept in the greenhouse. And as it is apt to grow out of form it should be kept well cut in, and new plants be frequently raised from seeds.

These plants cannot be preserved in pots. They flower the second year.

The second sort should have the seeds sown in pots and placed in a mild hot-bed, or on a very warm sheltered border, in the early spring; but the first is the best method, the plants being afterwards managed as tender plants, having either the protection of the greenhouse or of mats.

The third sort is raised from seeds sown either in pots or warm borders in the early spring months. It succeeds best in shady situations where the soil is of a sandy quality. The potted plants are often introduced in greenhouse collections; but they are capable of with-

standing the severity of most winters in the open air.

The fourth sort should have the seeds sown in the early spring on an open border, the plants being afterwards properly thinned and kept clean from weeds. It may likewise be raised from slips planted out at the same season. It is very hardy, and requires little trouble in its cultivation. They are all plants which afford ornament and variety in the borders, or among other potted plants of the green-house kind.

OPHIOXYLUM, a genus containing a plant of the shrubby climbing kind.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Apocineae*.

The characters are: that in the hermaphrodite flowers, the calyx is a five-cleft perianthium, acute, erect, very small: the corolla is one-petalled, funnel-form: tube long, filiform, thickened in the middle: border five-parted, spreading a little, without a nectary: the stamina have five filaments, very short, in the middle of the tube: anthers acuminate: the pistillum is a superior germ, roundish: style filiform, the length of the stamens: stigma capitate: the pericarpium is a berry twin, two-celled: the seeds solitary, roundish. Male flowers on the same plant: the calyx as in the hermaphrodites (bisid): corolla one-petalled, funnel-form: tube long: border five-cleft: nectary in the mouth of the corolla, cylindric, quite entire: the stamina have two filaments, very short: anthers acuminate, converging within the nectary.

The species is *O. serpentinum*, Scarlet-flowered Ophioxylum.

It has the stem upright, round, quite simple: the leaves in fours placed cross-wise, lanceolate-ovate, smooth, acuminate, petioled: nectary like that of narcissus; but according to Burmann the stem is three-cornered, jointed, striated; at each joint are three leaves, which are oblong acuminate, entire not serrate, in which they differ from those of the peach-tree, whose form they resemble: petioles short: at the top of the stem are many florets in a sort of umbel; and Jussieu describes it as a shrub with three or four leaves in whorls; flowers glomerate, terminating, males mixed with the hermaphrodites, two-stamened only, with a cylindric entire crown at the throat of the tube, without any germ: the berry fleshy, two-lobed, within a very small three- or five-cleft calyx, lenticular-compressed, two-celled, of a brick-red: it is a native of the East Indies, flowering in May and the following month.

Culture.—This may be raised by seeds, which should be sown in pots in the early spring and be plunged in a bark hot-bed, and when the

plants have attained some growth, removed into separate pots and re-plunged in the bark hot-bed of the stove, where the plants must be constantly kept. It may likewise be increased by layers and cuttings, which should be laid down or planted out at the same season and have the same sort of management as those procured from seeds.

They are ornamental stove plants.

OPHRYS, a genus comprising plants of the bulbo-fibrous-rooted perennial kind.

It belongs to the class and order *Gynandria Diandria*, and ranks in the natural order of *Orchidaceae*.

The characters are: that the calyx has wandering spathes: spadix simple: perianthium none: the corolla has five oblong petals, converging upwards, equal; two of these exterior: nectary longer than the petals, hanging down, posteriorly one somewhat keeled: the stamina have two filaments, very short, placed on the pistil: anthers erect, covered with the inner margin of the nectary: the pistillum is an oblong germ, contorted, inferior: style fastened to the inner margin of the nectary: stigma obsolete: the pericarpium is a subovate capsule, three-cornered, blunt, striated, three-valved, one-celled, opening at the keeled angles: the seeds numerous, like saw-dust: the receptacle linear, fastened to each valve of the pericarpium.

The species cultivated are: 1. *O. ovata*, Common Ophrys or Twayblade; 2. *O. spiralis*, Spiral Ophrys, or Triple Lady's Traces; 3. *O. nidus avis*, Bird's-nest Ophrys; 4. *O. muscifera*, Fly Ophrys; 5. *O. apifera*, Bee Ophrys; 6. *O. aranifera*, Spider Ophrys; 7. *O. monorchis*, Yellow or Musk Ophrys; 8. *O. anthropophora*, Man Ophrys.

The first has a perennial root, consisting like the third of numerous thick fleshy bundled fibres, and renewed every year: the stem from twelve to eighteen inches, and even two feet in height, below the leaves much thicker than above, and naked; above the leaves downy; the lower part of the stem immediately above the root is clothed with a membranaceous spathe of two or three leaves; about one-third of the height of the stem are placed two very broad ovate leaves, one embracing the other at the base, marked with about seven nerves, and much resembling the leaves of the broad plantain; above these are two or three very short ovate, acuminate stipules: the flowers numerous, in a loose spike, four inches long or more, yellowish green. The flowers have a fragrant musky scent. It is a native of most parts of Europe.

It varies with three leaves.

The second species has from one to three bulbs, or sometimes four, varying from oblong, and half

an inch in length, to cylindrical and an inch and half long, rough or villose, pointed, and furnished with a few fibres: the stem from six to nine inches high, the lower part smooth, the upper downy: the root-leaves four or more, forming a tuft, ovate-lanceolate, smooth, entire at the margins, bright green, half an inch in breadth, dotted when magnified, and faintly ribbed. By the side of these, and not from amongst them, arises the stem, clothed with three or four lanceolate, acuminate, embracing leaves, downy, and membranous at the edge: the spike from two to four inches long, twisted in a spiral form, with numerous (fifteen or more) flowers, growing from one side, and following its spiral direction. It is a native of many parts of Europe, flowering from August to October.

The third has the root composed of many strong fibres, from which arise two oval veined leaves, three inches long, and two broad, joined at their base; between these springs up a naked stalk about eight inches high, terminated by a loose spike of herbaceous flowers, resembling gnats, composed of five petals, with a long bifid lip to the nectarium, a crest or standard above, and two wings on the side. It is a native of many parts of Europe.

The fourth species has the bulbs roundish: the stem from nine to fifteen inches high: the leaves three or four, sheathing the stem at the base, lanceolate, pale green, smooth, shining, marked with numerous longitudinal nerves, the intermediate space covered with a thin somewhat pellucid puckered skin, giving them a silvery hue: the upper part of the stem naked, yellowish green, nearly round, smooth: the bractes linear-lanceolate, much longer than the germ, pale yellowish green: the flowers in a long thinly scattered spike; sometimes fifteen in number, but seldom more than four or five: it has much resemblance to a fly. It is a native of Sweden, &c. It flowers in May and June.

There are several varieties, as the fly-shaped; the great fly; the large green fly; the blue fly; and the yellow fly.

The fifth has the stem about a foot high, leafy, round except between the fructifications, where it is compressed: the leaves alternate, lanceolate, sheathing, pubescent, nerved: the bractes longer than the germs, lanceolate. The three outer petals large, spreading, purple, with the keel and two nerves green; the two inner petals very small, hairy, reflex, green: the lower lip of the nectary large, wide, but shorter than the petals, dusky purple mixed with yellow, three-lobed, the side-lobes smaller, hairy, reflex, triangular, acuminate; the middle one very large, pubescent, three-lobed, bent down, the middle segment

longer, acuminate; upper lip narrowed above with a point, longer than the lower lip, of a green colour: the filaments long: anthers very large: the germ longer than the petals, but shorter than the bracte, large, deeply grooved. It is a native of Europe, flowering in June and July.

The sixth species has the stem six inches high, more or less according to its place of growth, round, smooth, covered below with leaves embracing it: the leaves next the root an inch and half long, almost an inch broad, ovate-lanceolate, somewhat blunt, marked with impressed lines, smooth, spreading on the ground; those of the stalk few, narrower and more pointed: the flowers from three to six, in a thin spike. It is a native of Britain, flowering in June.

It is fancied by some to resemble a bee, by others a spider; from the breadth of the lip, and its being marked with different shades of brown, it derives its resemblance to the latter. Others have discovered a likeness to a small bird in the flower.

The seventh has a single bulb, round or somewhat oblong, with a few thick fibres from the crown: the stem about six inches high, round and smooth: the root-leaves two or three, sheathing the stem, lanceolate, acute, smooth, of a shining yellowish green, marked with parallel veins: on the stem one or two sessile awl-shaped leaves: spike an inch or an inch and half long, of numerous flowers, which are greenish yellow, with a faint musky smell. It is a native of many parts of Europe; Sweden, Denmark, &c., flowering in July.

The eighth species has a stem about a foot high, firm, smooth, round at the base, somewhat angular upwards: the root-leaves four or five, sheathing the stem at the base, lanceolate but varying in breadth, spreading: above these one or two more, closely embracing the stem: the flowers numerous, in a long loose spike. They vary in number from ten to fifty. The lip of the nectary is so divided as to bear a coarse resemblance to the human arms and legs, whence it has been named *Man Orchis*. It is a native of the southern parts of Europe, and England, flowering in June.

It varies in size, and in the colour of its flowers, from yellow green to bright ferruginous.

Culture.—All these plants may be introduced into the different parts of pleasure-grounds from the places where they grow naturally in this country, and be preserved; but they do not admit of being propagated in them; the proper period for this purpose is just before the stalks decay, in the latter end of summer or beginning of the autumn, as at that season the bulbs will be in the best state for growing strong and flowering the following

year. The roots should be taken up with large balls of earth round them, and be planted again as soon as possible. They should also be placed as as that the soils and situations may be as nearly as possible similar to those from which they were taken; those taken from woods being planted out in shady situations; those from boggy or marshy places, in the more moist and boggy parts; and those from dry elevated situations, in such as have the greatest degrees of dryness and are the most open. They should afterwards be as little disturbed as possible by any sort of culture;—with this sort of management the roots will often continue for several years, flowering annually during the summer.

In the culture of the sixth sort Mr. Curtis succeeded, by taking them up from their natural situations when in flower, and baring their roots no more than was necessary to remove the roots of other sorts of plants; then filling large-sized garden-pots with three parts good moderately stiff loam and one part chalk mixed well together, passing them through a sieve somewhat finer than a cinder sieve, afterwards planting the roots in them to the depth of two inches, and, where there is more than one, three inches apart, watering them occasionally during the summer season in dry weather, and on the approach of winter placing the pots under the protection of a frame and glasses in order to prevent their being injured by wet or frosts.

They all afford variety, and are highly ornamental in the clumps, borders, and other parts of shrubberies, &c.

ORCHARD, a portion of garden-ground set apart for the growth of different sorts of the more common sorts of fruit, but mostly that of the apple kind. The trees in this case are mostly of the standard kind, especially when large supplies of fruit are wanted, and generally consist of Apple-trees, Pear-trees, Plum-trees, and Cherry-trees; and, to render it more complete, should contain Quinces, Medlars, Mulberries, Service-trees, Filberts, Spanish Nuts, and Barberries, as well as Walnuts and Chestnuts. As the two last sorts are well adapted for sheltering the others from high winds, they should, Mr. Forsyth thinks, be planted in the boundaries of the orchard, a little closer than ordinary, for that purpose.

In providing trees, especially of the apple kind, for this purpose, too much care cannot be taken to admit of none but such as have good roots, fair clean stems, and proper heads; and at the same time attention should be paid that a proper assortment of the different sorts be procured for the supply of the table during the whole year, a few of the Summer sorts are sufficient, but more

of the Autumn, and still a larger quantity of the Winter kind will be necessary; as upon this last sort the chief dependence must be placed from the beginning of the year till nearly the period of the fruit being ready again.

In districts where the process of cyder-making is conducted upon a large scale, large orchards of apples only are often met with; and in some counties, as Kent, there are orchards wholly of Cherries, or these and Filberts. In general, however, there ought to be a much larger proportion of Apples than of any other fruit in orchards, as in proper situations they are very profitable; and, in addition, the trees have a delightful appearance when in blossom, as well as when the fruit is ripe.

Situation and Soil.—In respect to situation, an orchard should rather be elevated than low, as on a gentle declivity; open to the south and south-east, to give free admission to the air and rays of the sun, as well as dry up the damps and disperse the fogs, in order to render the trees healthy, and give a fine flavour to the fruit. It should likewise be well sheltered from the east, north, and westerly winds, by suitable plantations, where not naturally sheltered by hills or rising grounds. Such plantations, when they consist of forest-trees, should neither be too large nor too near the orchard; as where that is the case they prevent a free circulation of air, which is injurious to the trees. Where the ground does not admit of such plantations, Mr. Forsyth advises planting cross rows of fruit-trees, in the manner directed in gardens, as well as some of the largest-growing trees nearest the outsides exposed to those winds, two or three rows of which should, he says, be planted closer than ordinary, which would greatly shelter those in the interior parts of the Orchard, and be of great service, in addition, to the walnut and chestnut trees, as mentioned above.

Orchards are planted on many different sorts of soil and succeed well; but a dry friable loam is probably the most suitable, as trees of this sort are impatient of moisture. Such as have been mentioned for gardens will answer perfectly well, and such as produce good crops of corn, grass, or other vegetables, are mostly proper for an Orchard; and though the above sort is to be preferred, any of a good quality, not too light or dry, nor wet, heavy, or stubborn, but of a moderately soft and pliant quality, will be found to answer the end perfectly. The shingly and gravelly soils disagree very much with fruit-trees, unless there be loam intermixed with them. They succeed much better on a chalk bottom, or subsoil. On such a soil, Mr. Forsyth has

seen roots twelve feet deep, and the trees thrive well. Where the bottom is clay, the roots should, he says, be cut-in once in four years, to prevent them from penetrating the clay, which would greatly injure the trees. Whatever the nature of the soil may be, it should have a good depth, as two or three feet. Where the soils are wet they should be well drained in the same manner as has been directed for gardens, or by forming the land in ridges with furrows between the rows to convey off the moisture, the turf being relaid in case of the ground being in the state of sward.

Size.—In regard to the size of an Orchard, it may vary from one to ten and fifteen or more acres, according to the quantity of fruit wanted, or the proportion of ground that is fit for the purpose.

Preparation.—This is effected in different ways: but the best method is, probably, before planting the trees, to trench it two spits deep, and ten feet broad, where the rows are to be planted, and to loosen a spit below, unless it be clay, which should, Mr. Forsyth says, be trodden down. Where the ground is in pasture, it should, he says, be ploughed, and well summer-fallowed, till the grass be killed, otherwise when it is laid in the bottom in trenching, which it generally is, it will be very apt to breed grubs, which do much mischief. In bad shingly or gravelly soils, he recommends that holes should be dug at least three feet deep, and filled up with good mould: if mixed up with rotten dung, rotten leaves, or other manure, the trees will in time amply repay the expense: the dung used for this purpose should, he says, be that from the melon and cucumber beds, mixed with the mould from the same, when the beds are broken up in autumn, or winter; and be laid up in heaps, and continued so for one year at least; but be frequently turned and have some good fresh mould mixed with it. It is the practice with some to only dig holes large enough to receive the roots, especially in grass-ground which is to be continued so. Others prepare the ground by deep ploughing, if the Orchard is to be of great extent. The sward, if pasture, should be ploughed-in some time in spring; a good summer-fallow should be given it, ploughing it two or three times, which will rot the turf. A fortnight or three weeks before planting, it should have a good deep ploughing to prepare it for the reception of the trees. In Kent, and some other hop districts, they prepare their orchard-ground by the growth of hops upon it with the fruit-trees, by which they are much protected and brought forward.

Season of Planting.—In relation to the period of planting, it may be performed with success at different seasons, according to the nature of the land. The best time for planting on a dry soil is, Mr. Forsyth says, in October; but, if wet, the latter end of February, or the month of March, will be a more fit season. The chief circumstance in this business is to suit the trees as much as possible to the soil, and to plant them at proper distances from each other; which may be from forty to eighty feet, according to the size of the trees when full grown. He observes that fruit-trees, when planted too thick, are very liable to blights, and to be covered with moss, which robs them of a great part of their nourishment, besides spoiling the flavour of the fruit.

Procuring the Trees.—In providing the trees it is a good practice to procure them from a soil nearly similar to, or rather worse than, that where they are intended to be planted; as trees transplanted from a rich soil to a poorer one never thrive so well; but if from a poor to a richer soil, they generally succeed in a perfect manner. Good trees, which have been properly pruned, which are quite free from bruises and disease, should always be carefully selected; and their roots be preserved as much as possible when taken up.

The most proper sorts of trees for small orchards may be those of the Jancting, Golden Pippin, Nonesuch, Ribston Pippin, Nonpareil, Queen, Sky-house, Golden Rennet, Aromatic Pippin, Grey Leadington, Scarlet Pearmain, Lemon Pippin, Pommegrise, French Crab, Russeting and Codling kinds. But various other sorts may be employed where the orchards are extensive, and a great variety of fruit necessary.

Planting the Trees.—With regard to the proper distance of planting the trees, it should be regulated by the natural growth or spreading of them when fully grown, as well as the nature and goodness of the soil. It was formerly the practice to have them put in at narrow distances; but at present ten, twelve, or fifteen yards are more common, and in the cyder districts from twenty to twenty five yards are in use. The usual mode of arranging the trees is, in open grounds in lines or rows; but in close plantations the quincunx method is more in use. In the row method, when it can be done, they should be in the direction of north and south, or one point more to the east, as by this means they will have the advantage of the sun from the early part of the morning in the spring season, which will in a great measure prevent the damp

fogs from hanging upon them and hindering the due increase of the fruit.

In the act of planting or putting them into the ground, great care should be taken that they are not put in to too great a depth, as where that is the case they are in great danger of being destroyed. It is also necessary that a bed of fine good mould be provided for them, and that it be carefully put in with them, so as to be properly insinuated among the fibres of the roots, and afford them due support; the whole being carefully trodden round the plants in finishing the business.

Upon this being performed in a proper and perfect manner, and the young trees afterwards kept perfectly steady by suitable supports, the success of the planter in a great measure depends.

Where the trees are planted in the quincunx order, and at the distance of eighty feet, Mr. Forsyth says, "the ground between the rows may be ploughed and sown with wheat, turnips, &c. or planted with potatoes: the ploughing or digging the ground, provided it be not done so deep as to hurt the roots, by admitting the sun and rain to meliorate the ground, will, he thinks, keep the trees in a healthy flourishing state. It will be necessary to support the young trees by tying them to stakes until they are well rooted, to prevent their being loosened or blown down by the wind.

"In the spring after planting, if it prove dry, some turf should be dug and laid round the stems of the young trees with the grassy side downwards; which will keep the ground moist, and save a deal of watering: if the trees have taken well, this need not be repeated, as they will be out of danger the first year. The turf should be laid as far as the roots of the trees are supposed to extend; and when it is rotted it should be dug-in, which will be of great service to their roots.

"Such trees as are of very different sizes when full grown should not, he says, be planted promiscuously; but, if the soil be properly adapted, the larger planted in the back parts or higher grounds, or at the north ends of the rows, if they run nearly north and south, and the others in succession according to their size. The trees when planted in this manner will have a fine effect when grown up; but if they are planted promiscuously, they will not appear so agreeable to the eye; and, besides, the smaller trees will be shaded by the larger, which injures them, and spoils the flavour of the fruit.

"It is advised that Orchards should be dunged once in two or three years with some sort of good manure, as this is of much advantage in rendering them fruitful and productive.

"The stems of trees in those where cattle feed should be high enough to prevent their eating the lower branches; and fenced in such a manner as to prevent their being barked, or injured by the cattle rubbing against them, particularly when young; which may be done by triangles of wood, or the trees may be bushed with thorns.

But in orchards where cattle are not permitted to go, Mr. Forsyth prefers "dwarf-trees to standards, taking care to proportion the distance of the rows to the size of the trees."

After-Management.—This chiefly consists in keeping the trees properly pruned and cut-in; as where this is judiciously done the trees will come into bearing sooner, and continue in vigour for nearly double the common time. But with these standard-trees less culture is necessary than in other cases. No branch should ever be shortened, unless for the figure of the tree, and then it should be taken off close at the separation. The more the range of branches shoot circularly, a little inclining upwards, the more equally will the sap be distributed, and the better the tree bear. The ranges of branches should not be too near each other, that the fruit and leaves may not be deprived of their full share of sun; and where it suits, the middle of the tree should be so free from wood, that no branch may cross another, but all the extremities point outwards.

About October or November, or as soon as the fruit is removed, is the most proper season for this work. It is the best practice to take off superfluous branches with a saw, and afterwards to smooth the place with a knife; for it is essential that every branch which is to come off should be cut perfectly close and smooth. The wounded part may then be smeared over with a proper composition. Such branches should always be taken off as come near to the ground, that have received any material injury, where the leaves are much curled, or that have a tendency to cross the tree or run inwards. And a little attention may be given to the beauty of the head, leaving all the branches as nearly equidistant as possible. Where there are any remaining blotches, they should be opened or scored with a knife; and where the bark is ragged from any laceration, it should be pared gently down to the live wood: touching over each with a proper composition. This being done, the moss should be rubbed clean off, and the trees scored. In this last operation, care should be taken not to cut through the inner or white rind, which joins the bark to the wood. When trees are much thinned, they are subject to throw out great quantity of young shoots in the spring, which

should be rubbed off, and not cut, as cutting is apt to increase the number.

The great enemy to orchards where apples are grown, is Mistletoe, and is often permitted to become very injurious to them. The usual method of clearing trees from it, is to pull it out with hooks in frosty weather, when brittle, and readily broken off from the branches. A labourer is capable of clearing fifty or sixty trees in a day.

Moss, moist spring frosts, blights, and several other similar causes are highly injurious to this sort of tree, as is shown under these particular heads.

ORCHIS, a genus containing plants of the hardy herbaceous bulbous-rooted flowery perennial kind.

It belongs to the class and order *Gynandria Diandria*, and ranks in the natural order of *Orchideæ*.

The characters are: that the calyx is a wandering spathe: spadix simple: perianthium none: the corolla has five petals; three outer, two inner, converging upwards into a helmet: nectary one-leafed, fastened to the receptacle by the lower side between the division of the petals: upper lip erect, very short; lower lip large, spreading wide: tube behind horn-shaped, nodding: the stamina have two filaments, very slender, very short, placed on the pistil: anthers obovate, erect, covered with a bilocular folding of the upper lip of the nectary: the pistillum is an oblong germ, twisted, inferior: style fastened to the upper lip of the nectary, very short: stigma compressed, blunt: the pericarpium is an oblong capsule, one-celled, three-keeled, three-valved, opening three ways under the keels, cohering at the top and base: the seeds numerous, very small, like saw-dust.

The species cultivated are: 1. *O. bifolia*, Butterfly Orchis; 2. *O. morio*, Female or Meadow Orchis; 3. *O. mascula* Male or Early Spotted Orchis; 4. *O. militaris*, Man Orchis; 5. *O. latifolia*, Broad-leaved or Marsh Orchis; 6. *O. maculata*, Spotted Orchis; 7. *O. conopsea*, Long-spurred Orchis; 8. *O. abortiva*, Purple Bird's Nest, or Bird's Nest Orchis.

The first has ovate bulbs, tapering to a point at the base, white within and without; thick fleshy fibres come out above them from the base of the stem: the stem a foot or eighteen inches high, smooth, six-angled, three ribs running down from each leaf: leaves usually two, (sometimes three,) springing from the root, ovate, blunt, tapering at the base, five or six inches long, and from two to three inches wide, smooth, pale green above, silvery beneath, marked with numerous parallel veins: on the stem are three

or four lanceolate, sessile leaves, the lowest of which are longest: the flowers are numerous in a long loose spike. It is a native of Britain, &c.

The second species has roundish bulbs, the size of a hazel-nut or of a nutmeg, one fixed to the base of the stem, and the other connected to the base by a fibre half an inch long, and the thickness of packthread: above them are largish spreading fibres: the stalk from six or seven inches to a foot or more in height, upright and leafy: the leaves embracing, lanceolate, marked with lines, glaucous, shining on the upper side, underneath silvery; the bottom ones for the most part turning back and variously contorted: the flowers few, from six to eight, seldom more than twelve, purple, sitting loosely on the stalk. It is a native of this country.

There are varieties with purple flowers, with red flowers, with violet flowers, with flesh-coloured flowers, and with white flowers.

The third has large, oval bulbs, both fixed to the base of the stem, which is about a foot high, round, smooth, upright, solid, above naked and purplish, below clothed with surrounding leaves; these are lanceolate, alternate, broadish, the lower ones sheathing at the base, spreading upwards, bright green and shining above, glaucous beneath, marked longitudinally with parallel veins, and usually spotted with large brown or dark purple spots: the upper leaves closely sheath the stem, and are pale green: the flowers in a loose spike, numerous. It is a native of England.

The fourth species has the stem about one foot high, round and smooth: the leaves about four, sheathing, acutely lanceolate, the three lower spreading, the upper one closely embracing, bright green, with numerous parallel veins: the spike from one to two inches long, with numerous flowers: bractes very short, membranaceous, oval but pointed, and terminated with an awn: petals all convergent, three exterior large and broad, oval-lanceolate, acute, two interior, narrow, linear or somewhat awl-shaped, all greenish white with purple lines: lip of the nectarium purplish, or white with purple dots, long and narrow, divided into three segments, the two outer near the upper part linear, half as long as the lip, the lower again slightly divided into three, the two outer broader, rounded, slightly serrate, the middle one appearing like a spine: horn blunt, half as long as the germ: cases to the anthers distant: the anthers yellow. It is a native of Britain.

There are several varieties.

The fifth has broad and flat bulbs, divided into a few fingers, which sometimes run out into a long

fibre, striking downwards; several short thick fibres also shoot out laterally from the top of the bulbs: the stem about a foot (or eighteen inches) high, smooth, hollow, somewhat angular towards the top: the leaves five or six, alternate, sheathing the stem to the spike, acutely lanceolate, keeled and marked with parallel veins, pale green, rarely spotted, and when so, very obscurely; the bractes much longer than the flowers, resembling the uppermost leaves, acutely lanceolate, green, sometimes with a tinge of purple: the flowers very numerous (forty), in a close somewhat conical spike, for the most part rose or flesh-coloured with us, often purple, rarely white. It is a native of Europe, flowering at the end of May.

There are different varieties.

The sixth species has palmated, compressed bulbs, with the segments much divaricated: stem solid, from seven or eight to eighteen inches high, the lower part round, the upper somewhat angular: the lower leaves embracing the stem, lowest constantly short, broad and blunt, the next considerably longer, bluntly lanceolate; above these more acutely lanceolate; upper ones very narrow and apparently sessile, but the margins are decurrent, whence the angular appearance of the stem; beneath they are silvery green, with parallel green nerves, above pale green, often partially covered with the same silvery skin, marked with numerous reddish brown spots, mostly oval and transverse, but sometimes irregular: the flowers numerous (forty) in a close conical spike. It is a native of Europe.

It varies with purple flowers, red flowers, and white flowers.

The seventh has palmated, compressed bulbs; the stem twelve to eighteen inches high, smooth and firm, round below; angular upwards; lower leaves sheathing the stem, long, narrow, and acutely lanceolate, bright green, shining, keeled, with a strong midrib, on each side of which are two or three faint veins and one strongly marked: the lower stem-leaves embracing, upper sessile, lanceolate, acute, decreasing in size till they resemble the bracte: the flowers flesh-coloured or pale purple, (forty-two) in a loose spike, three inches long, smelling very sweet. It is a native of Europe.

The eighth species has the roots composed of thick horizontal fibres wrinkled transversely: the stem straight, upright, eighteen inches or more in height, blue or violet, leafless but sheathed with scales: the flowers in a very long thin spike, violet. It is a native of France, &c.

The whole plant is of a violet or deep purple colour.

VOL. II.

Culture.—These curious plants may all be introduced and preserved in the pleasure-grounds, by proper care in removing them from their native situations, which should always be done when their leaves decline, being previously marked. When removed at other seasons, they seldom succeed.

They should be taken up with balls of earth about their roots, and be immediately replanted, in a soil and situation as nearly as possible the same as that from which they were taken. When thus managed, they continue many years flowering in a strong manner.

They afford much variety where the different kinds are introduced in the borders and other parts.

ORIGANUM, a genus affording plants of the herbaceous annual and under-shrubby perennial kinds.

It belongs to the class and order *Didymia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a spiked involucre, composed of imbricate, ovate, coloured bractes: perianthium unequal, various: the corolla one-petalled, ringent: tube cylindrical, compressed: upper lip erect, flat, blunt, emarginate: lower trifid, the segments almost equal: the stamina have four filiform filaments, the length of the corolla, of which two are longer: anthers simple: the pistillum is a four-cleft germ: style filiform, inclined to the upper lip of the corolla: stigma very slightly bifid: there is no pericarpium: calyx converging, fostering the seeds at bottom: the seeds four, ovate.

The species cultivated are: 1. *O. vulgare*, Common Marjoram; 2. *O. onites*, Pot Marjoram; 3. *O. majorana*, Sweet or Knotted Marjoram; 4. *O. heracleoticum*, Winter Sweet Marjoram; 5. *O. Ægyptiacum*, Egyptian Marjoram; 6. *O. dictamnus*, Dittany of Crete or Candia.

The first has a perennial, creeping, horizontal, brown root, tufted with numerous fibres: the stem a foot, eighteen inches, or near two feet in height, upright, somewhat woody, a little downy, and often tinged with purple: the branches opposite, upright, more tender than the stalk, in other respects similar: the leaves are ovate, pointed, finely and thinly toothed, above nearly smooth, beneath downy, dotted on both sides, the edges finely ciliate, spreading: the petioles downy: axils of the leaves, in the cultivated plant, bear numerous smaller leaves. It is an aromatic and ornamental plant, growing wild in thickets and hedges, chiefly in a calcareous soil; and flowering from the end of June through the following month. It is found in most parts of Europe.

There are varieties with white flowers and light-green stalks; with purple flowers and with variegated leaves; which is sometimes cultivated in gardens, under the title of *Pot Marjoram*, used in soups.

The second species has the habit of Sweet Marjoram, but it is woody: the stems woody, perennial, a foot and half high, branched, spreading with long hairs: the leaves small, sessile, acute, thinly serrate, tomentose on both sides; with rudiments of branches from the axils: the spikes heaped, as in the third sort, but oblong, by threes on each peduncle, the middle ones sessile, villous: the flowers are white, appearing in July. It is a native of Sicily.

The third has a biennial, brown root, with many long tough fibres: the stems numerous, woody, branched, a foot and half high: the leaves are downy, entire, pale green, petioled: the flowers small, white, appearing successively between the bracteal leaves, which are numerous, and form roundish compact terminating spikes. It begins to flower in July, when it is cut for use, and called *Knotted Marjoram*, from the flowers being collected into roundish knotted close heads. It is probably a native of China.

The fourth species has a perennial root, from which arise many branching stalks a foot and half high, hairy, and inclining to a purplish colour: the leaves ovate, obtuse, hairy, greatly resembling those of Sweet Marjoram, on short foot-stalks: the flowers in spikes about two inches long, several arising together from the divisions of the stalk: the flowers are small, white, peeping out of their scaly covers. It grows naturally in Greece, &c.

It is at present commonly known by the name of *Winter Sweet Marjoram*, but was formerly called *Pot Marjoram*, being chiefly used for nosegays, as coming sooner to flower than Sweet Marjoram.

There is a variety with variegated leaves.

The fifth is a perennial plant with a low shrubby stalk, seldom rising more than a foot and half high, dividing into branches: the leaves roundish, thick, woolly, hollowed like a ladle; they are like those of common Marjoram, but of a thicker substance, and have much the same scent: the flowers are produced in roundish spikes, closely joined together at the top of the stalks, and at the end of the small side branches; they are of a pale flesh colour, peeping out of their scaly coverings. It is a native of Egypt, flowering from June to August.

The sixth species is also a perennial plant: the stalks hairy, about nine inches high, of a purplish colour, sending out small branches

from the sides by pairs: the leaves round, thick, woolly, very white; the whole plant has a piercing aromatic scent, and biting taste: the flowers are collected in loose leafy heads of a purple colour, nodding, and small. It is a native of the island of Candia, flowering from June to August.

Culture.—The four first sorts may be readily increased by slips, cuttings, and parting the roots, and in the first and third sorts also by seeds.

The seed should be procured fresh from the seed-shops, and be sown in the early spring months, as March or the following month, on a bed or border of good light mould, raking it in lightly. When the plants are up and have attained a few inches in growth, they should be planted out during moist weather, in a warm dry situation, in rows ten or twelve inches distant, to remain, water being given occasionally till they become perfectly rooted. When the plants are designed for the borders or clumps, the seeds may be sown in patches where the plants are to remain.

The roots of the strongest plants may be parted so as to have some root-fibres to each in the early autumn or spring season, and be planted out in rows in the same manner as those raised from seed; having the same management afterwards till fresh rooted. The slips or cuttings of the branches should be taken off in the summer, and immediately planted out where the plants are to remain.

All the sorts should be afterwards kept perfectly clean from weeds during the summer season, and in the autumn have the decayed stalks cleared away, loosening the mould about the plants; and when in beds, digging the alleys and throwing a little of the earth over the beds.

When necessary the plants may be removed into the pleasure ground, with small balls of earth about their roots, either in the autumn or early spring.

The other tender kinds may be increased by planting slips or cuttings of the young shoots, in the spring and summer months; in the former season in pots of light earth, plunging them in a mild hot-bed, but in the latter either in pots or warm shady borders; water being immediately given and occasionally repeated in small proportions, being covered down by hand glasses in the latter case, to expedite their rooting; being removed, when the plants begin to shoot at the top. In the autumn the plants may be removed into separate small pots, and afterwards treated as the more hardy plants of the green-house kind.

The three first sorts are useful as culinary plants, as well as ornamental in the borders of the pleasure ground: and the other kinds afford variety in the green-house collections.

ORNITHOGALUM, a genus containing plants of the bulbous-rooted, flowery, herbaceous, perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla has six petals, lanceolate, upright below the middle, above it spreading, permanent, losing their colour: the stamina have six upright filaments, alternately widening at the base, shorter than the corolla: anthers simple: the pistillum is an angular germ: style awl-shaped, permanent: stigma blunt: the pericarpium is a roundish capsule, angular, three-celled, three-valved: the seeds many and roundish.

The species cultivated are: 1. *O. umbellatum*, Umbelled Star of Bethlehem; 2. *O. luteum*, Yellow Star of Bethlehem; 3. *O. minimum*, Small Star of Bethlehem; 4. *O. Pyrenaicum*, Pyrenean Star of Bethlehem; 5. *O. latifolium*, Broad-leaved Star of Bethlehem; 6. *O. pyramidalis*, Pyramidal Star of Bethlehem; 7. *O. unifolium*, One-leaved Star of Bethlehem; 8. *O. nutans*, Neapolitan Star of Bethlehem; 9. *O. Capense*, Cape Ornithogalum; 10. *O. aureum*, Golden Star of Bethlehem.

The first has a solid bulb, having smaller bulbs joining to it: the root-leaves (sometimes five) soft, keeled, or convex on the outside and channelled within, with a white silvery streak, from one to two lines in width, and above a foot in length, linear, bright green: the scape upright, round, very smooth, a long span or a foot in height, terminating at top in alternate peduncles, very long and broad; all together forming a sort of corymb, resembling an irregular umbel, but not springing from the same point, the lower ones being longer: the flowers are all nearly of the same height; they are one-flowered, and each has a white, membranaceous, lanceolate, very large bracte. Woodward remarks that it is improperly called *umbellatum*, as the flowers are in a most evident spike (or rather corymb). It is a native of the southern parts of Europe, &c., flowering in April and May.

The second species has the root-leaves generally single, and longer than the stem, which is from four to six inches high: the stem-leaves two, three, or four, one very large, the other smaller, all unequal; fringed with fine white hairs: from these arise a few fruit-stalks, (three

to seven) each supporting one flower, and forming an umbel. It is a native of most parts of Europe, flowering in April.

Its roots have been used for food in times of scarcity, in Sweden.

In the third, according to Miller, the bulbs are not larger than peas. There is one or two narrow keel-shaped leaves about five inches long, of a grayish colour, arising from them. The stalk is angular, about four inches high, having two narrow keel-shaped leaves just below the flowers, which are disposed in an umbel on branching peduncles, yellow within but of a purplish green on the outside; they appear in May, and are succeeded by small triangular capsules filled with reddish uneven seeds. It is a native of Sweden, &c.

The fourth species has a naked stem, a foot and half or two feet high: the flowers are in a long spike on slender peduncles, each arising from a membranaceous half-embracing bracte, broad at the base, tapering to a point: the bulb pretty large, with several long keeled leaves coming out from it and spreading on the ground; among these comes out a single naked stalk about two feet long, sustaining a long loose spike of flowers of a yellowish green colour, on pretty long peduncles, and spreading wide from the principal stalk. The flowers have an agreeable scent, and appear in May. It is a native of some parts of Europe.

The fifth has a large bulb; the root-leaves are several, broad, sword-shaped, spreading on the ground: the stalk thick, strong, between two and three feet high, bearing a long spike of large white flowers, upon long pedicels: the leaves are a foot long, and more than two inches in breadth. It has been observed by Clusius, with above one hundred flowers on a spike. It is a native of Egypt and Arabia, flowering in June.

The sixth species has a very large oval bulb, from which arise several long keeled leaves, of a dark green colour; in the middle of these springs up a naked stalk, near three feet high, terminated by a long conical spike of white flowers, on pretty long pedicels. It grows naturally in Spain and Portugal, flowering in June.

The seventh has an ovate bulb, the size of a hazel nut: the leaf is upright, flat, broad-lanceolate, blunt, naked, ciliate, sheathing the scape at the base: the scape upright, round, longer than the leaf, terminated by a few-flowered raceme; the flowers peduncled, alternate. It is a native of the Cape of Good Hope.

The eighth species has a pretty large, com-

pressed bulbous root, from which come out many long, narrow, keeled leaves of a dark green colour. the stalks are very thick and succulent, about a foot high, sustaining ten or twelve flowers in a loose spike, each hanging on a footstalk an inch long. It is a native of Italy, flowering in April and May.

The ninth has an irregular tuberous root, varying greatly in form and size, covered with a dark brown skin, from which spring several leaves, upon pretty long footstalks, having several longitudinal veins: the flower-stalks are slender, naked, and about a foot high, sustaining several small greenish-white flowers, formed in a loose spike, standing upon long slender pedicels: they come out in November. It is a native of the Cape of Good Hope.

The tenth has a whitish bulb, from which spring three or four smooth, somewhat fleshy, upright, dark green leaves, about half an inch wide, and three or four inches long, edged with white, and, if magnified, appearing fringed with very fine villose hairs: the stalk is naked, from eight to twelve inches high, supporting many flowers, which spring from the axils of large, hollow, pointed bractes, and, opening one after another, keep the plant a considerable time in flower; they are usually of a bright orange or gold colour, but sometimes paler. It is a native of the Cape of Good Hope, flowering in January and February.

Culture.—All the sorts are capable of being increased by planting the strong off-sets from the old roots in the latter end of the summer season, when their leaves and stems begin to decay, either in beds or the borders; the old roots may either be immediately replanted or kept out of the ground some time, but they flower much stronger when put into the ground in autumn, than if kept out till the spring. The small off-set bulbs should be planted out in nursery rows in beds for some time, till sufficiently large to be finally set out where they are to grow. They should have a light sandy soil, little manured.

They afterwards require the same management as other hardy bulbs. See BULB; but they should be removed every other year, as when let remain longer they become weak.

The two last sorts should have the off-sets or slips planted in separate pots, at the same time with the above, filled with good light earth, placing them under a hot-bed frame, so as to be protected from wet during the winter season, giving them full air in the summer. The old roots may be taken up in the autumn as in the other sorts, and after being kept a little while out of the ground, be replanted in the beginning of the autumn.

The hardy sorts are all highly ornamental among other flowering bulbous-rooted plants, in the borders, clumps, &c.

And the two last kinds afford variety in the collections of potted plants of the flowering bulbous-rooted sorts.

OROBUS, a genus containing plants of the hardy herbaceous fibrous-rooted perennial flowery kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianthium, tubular, blunt at the base: mouth oblique, five-toothed, very short; the three lower toothlets sharper; the two upper shorter, more deeply and bluntly divided: shrivelling: the corolla is papilionaceous: banner obcordate, reflex at the tip and sides, longer: wings two, oblong, almost the length of the banner, rising, with the edges converging: keel manifestly bifid below, acuminate, rising; with the edges converging, parallel, compressed; the bottom ventricose: the stamina have diadelphous filaments, (simple and nine-cleft), ascending: anthers roundish: the pistillum is a cylindrical germ, compressed: style filiform, bent upwards, erect: stigma linear, pubescent on the inner side from the middle to the top: the pericarpium is a round legume, long, acuminate, and ascending at the end, one-celled, two-valved: the seeds very many and roundish.

The species cultivated are: 1. *O. lathyroides*, Upright Bitter-Vetch; 2. *O. luteus*, Yellow Bitter-Vetch; 3. *O. vernus*, Spring Bitter-Vetch; 4. *O. tuberosus*, Tuberous Bitter-Vetch; 5. *O. niger*, Black Bitter-Vetch; 6. *O. Pyrenaicus*, Pyrenean Bitter-Vetch.

The first has a perennial root: the stalks three or four, branching, about a foot high: the leaflets smooth, stiff, of a lucid green: the flowers in close spikes on short peduncles, from the axils of the leaves at the top of the stalks, where are generally three or four of these spikes standing together: the corolla is of a fine blue colour: the flowers appear in June. It is a native of Siberia.

The second species has a very thick root, often transverse, hard, with the fibres widely diffused: the stem is a foot high and more, straight, angular, striated, smooth: the leaflets four or five pairs, entire, veined on both sides, netted, smooth, whitish underneath, terminated by a bristle; sometimes there is an odd leaflet: the stipules semisagittate, entire, or obscurely serrate with distant teeth, of the same colour with the leaves: peduncles angular, striated, smooth, naked, twice as long as the leaves: the flowers in loose spikes,

all directed the same way, twelve or more, of a yellow colour. It is a native of Siberia:

The third has a perennial root, creeping, not tuberous, woody, black, with many strong fibres: the stem about a foot high, upright, unbranched, smooth, angular, twisted or elbowed at each insertion of the leaves: the leaves alternate, petioled, leaflets two or three pairs, without an odd one, large, ovate-lanceolate, sessile, quite entire, nerved, bright green, smooth, tender: the stipules at the base of the petioles large, wide: the flowers are blue. It is a native of many parts of Europe, flowering in March or April.

There are varieties with purple flowers, with pale blue flowers, with deep blue flowers.

The fourth species has a perennial root, consisting of tough fibres, swelling here and there into irregular tubercles, each of which produces a stalk about a foot high, simple, upright, having two or three leafy or winged angles: the leaves are alternate, three or four in number; each consisting of two or three pairs of smooth sessile leaflets without an odd one, the petiole terminated by a kind of awn, as are the leaflets, being a production of the midrib; leaflets all elliptical, blueish underneath, the lower ones broader, the upper approaching to linear, all having three nerves or longitudinal veins: the stipules in pairs at the base of each leaf, frequently entire, but more often jagged at bottom, with one or several teeth: the flowers from two to four or five in a thin spike on naked slender axillary peduncles, of a reddish purple. It is a native of most parts of Europe, flowering in May and June, and sometimes in April.

It is sometimes called *Wood-Pea* and *Heath-Pea*.

The fifth has a perennial root, strong, woody: the stems many, branching, two feet high, having one pinnate leaf at each joint, composed of five or six small, oblong, oval leaflets: the flowers are on very long axillary peduncles, having four, five, or six purple flowers at the top. It is a native of most parts of Europe, flowering from May to July.

The sixth species has the stem angular, with the angles slightly winged, branched, somewhat villose: the leaflets on short petioles; the nerves underneath villose: the stipules oblong, one-tailed: the racemes striated: the flowers directed one way, pendulous: standard obcordate, red, with lines of a deeper colour. It is a native of the South of Europe.

Culture.—All the sorts are capable of being increased by seeds and parting the roots. The seed should be sown in the beginning of the autumn, as in September or October, in the clumps, borders, or other parts where they are to remain,

or on a bed of good earth, to be afterwards pricked out and transplanted. The plants should be kept perfectly free from weeds.

The roots of the large plants may be parted in the autumn, and immediately planted out where the plants are to grow. The small roots may be set in nursery rows, to remain till sufficiently strong for being finally planted out.

They are all hardy flowering ornamental plants for the borders, clumps, and other parts of pleasure-grounds.

ORYZA, a genus containing plants of the exotic annual kind.

It belongs to the class and order *Hexandria Digynia*, and ranks in the natural order of *Gramina* or *Grasses*.

The characters are: that the calyx is a one-flowered glume, two-valved, very small, acuminate, almost equal: the corolla two-valved: valves boat-shaped, concave, compressed, the larger five-angled, awned: nectary (petals of Micheli) two-leaved, flat, on one side of the germ, very small: leaflets narrow at the base, truncate at the tip, caducous: the stamina have six capillary filaments, the length of the corolla: anthers bind at the base: the pistillum is a turbinate germ: styles two, capillary, reflex: stigmas club-shaped, feathered: there is no pericarpium: corolla growing to the seed, oval-oblong, compressed, margins thin, two streaks on each side at the side: the seed single, large, oblong, blunt, compressed, with two streaks on each side.

The species is *O. sativa*, Rice.

It has the culm from one to six feet in length, annual, erect, simple, round, jointed: leaves subulate-linear, reflex, embracing, not fleshy: the flowers in a terminating panicle: the calycine leaflets lanceolate: the valves of the corolla equal in length: the inner valve even, awnless: the outer twice as wide, four-grooved, hispid, awned: the style single, two-parted. It is a native of India.

There are several varieties.

The *Common Rice* has the culm four feet high: the panicle spiked, the spikes commonly simple: the fruit oblong, pale, with long awns. It is late, and is cut from six to eight months after planting.

The *Early Rice* has the culm three feet high: the panicle spiked; spikes branching: the fruit turgid, brownish red, with shorter awns. It ripens and is cut in the fourth month from planting.

The *Dry or Mountain Rice* has the culm three feet high, and more slender: the fruit longish, with awns the longest of all. It is sown on mountains, and in dry soils.

The *Clammy Rice* has the culm four feet high:

the leaves wider, yellowish : panicle large, with shorter awns : the seed oblong, largish, glutinous, usually very white. This is cultivated both in wet and dry places.

It varies with a black seed, which is higher flavoured, and also with a red seed.

There are other varieties.

Culture.—These plants may be increased by seeds in the early spring.

The seeds should be sown on a hot-bed, and when the plants are come up, be transplanted into pots filled with rich light earth, and placed in pans of water, which should be plunged into a hot-bed ; and as the water wastes, it must be renewed from time to time. They must be kept in the stove all the summer, and towards the end of August they will produce the grain, which will ripen tolerably well, provided the autumn prove favourable for the plants.

They afford variety in the hot-house collections.

OSIER. See SALIX.

OSTEOSPERMUM, a genus comprising plants of the shrubby exotic kind for the greenhouse.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are : that the calyx is common, simple, hemispherical, many leaflets awl-shaped, small : the corolla is compound, rayed : the corolllets hermaphrodite very many, in the disk : females about ten in the ray : proper of the hermaphrodite tubular, five-toothed, the length of the calyx : of the female ligulate, linear, three-toothed, very long : the stamina in the hermaphrodites have five capillary filaments, very short : anther cylindrical, tubulous : the pistillum in the hermaphrodites has the germ very small : style filiform, scarcely the length of the stamens : stigma obsolete :—in the females, germ globular : style filiform, the length of the stamens : stigma emarginate : there is no pericarpium : calyx unchanged : the seeds in the hermaphrodites none :—in the females solitary, subglobular, coloured, at length hardened, inclosing a kernel of the same shape : pappus none : the receptacle is naked and flat.

The species cultivated are : 1. *O. spinosum*, Prickly Osteospermum ; 2. *O. pisiferum*, Smooth Osteospermum ; 3. *O. moniliferum*, Poplar-Leaved Osteospermum ; 4. *O. polygaloides* ; 5. *O. cæruleum*, Blue-flowered Osteospermum.

The first is a low shrubby plant, which seldom rises above three feet high, and divides into many branches : the ends of the shoots are beset with green branching spines : the leaves are very clammy, especially in warm weather ; they are

long and narrow, and set on without any order : the flowers are produced singly at the ends of the shoots ; they are all yellow, and appear in July and August. It is a native of the Cape of Good Hope, flowering from February to October.

The second species has the angles of the branches toothleted by the back of the petioles running down, and are frequently wholly involved in wool, which disappears with age : the leaves are wedge-form, erose : the peduncles scaly : the flowers small : the seeds obovate : the stem four or five feet high, dividing into many branches towards the top, which spread out flat on every side ; they have a purplish bark. It produces tufts of yellow flowers at the extremity of the shoots, from spring to autumn.

The third rises with a shrubby stalk seven or eight feet high, covered with a smooth gray bark, and dividing into several branches : the leaves alternate, of a thick consistence, covered with a hoary down, which goes off from the older leaves, unequally indented on their edges : the flowers are in clusters at the ends of the branches, six or eight coming out together on petioles an inch and half long, of a yellow colour.

It seldom flowers in this climate ; but the time of its flowering is July or August.

The fourth species has three small branches : the leaves small, oblong, sessile, on some of the upper branches imbricate : the flowers come out at the end of the branches, standing singly on peduncles about an inch long.

The fifth is an undershrub, three feet high, with a strong smell : the root woody, branching, fibrous : the stem somewhat woody, erect, round, regularly branched, gray : the leaves alternate, spreading : segments alternate, (some almost opposite,) oblong, acute, serrate ; the lower sinuses wider, deeper, parallel to the midrib ; the upper ones rounded ; they are without veins, and have only one nerve prominent beneath ; are of the same colour on both sides, and fragrant, from an inch and a half to two inches in length, and fifteen lines in breadth : the flowers terminating, very loosely corymbed, peduncled, erect, blue, an inch wide. It is a native of the Cape.

Culture.—These plants may be increased by cuttings of the young shoots, which may be planted in any of the summer months, upon a bed of light earth, being watered and shaded until they have taken root, when they must be taken up and planted out separately in pots ; as when they are suffered to stand long, they are apt to make strong vigorous shoots, and be difficult to transplant afterward, especially the second and third sorts ; but there is not so much danger of the first, which is not so vigorous, nor so easy in taking root as the other. In the summer season

the pots should be frequently removed, to prevent the plants from rooting through the holes in the bottoms of the pots into the ground, which they are very apt to do when they continue long undisturbed, and when they shoot very luxuriantly; and on their being removed, these shoots, and sometimes the whole plants, are destroyed.

As the plants are too tender to live in the open air in this climate, they should be placed in the green-house in October, and be treated in the same manner as Myrtles, and other hardy green-house plants, which require a large share of air in mild weather; and in the beginning of May the plants removed into the open air, and placed in a sheltered situation during the summer season. As the first and second sorts are very thirsty plants, they should have plenty of water.

These plants afford variety among others of the green-house kind.

OSWEGO TEA. See MONARDA.

OSYRIS, a genus containing a plant of the shrubby kind.

It belongs to the class and order *Dioecia Triandria*, and ranks in the natural order of *Calycifloræ*.

The characters are: that in the male, the calyx is a one-leafed perianthium, trisid, turbinate: segments equal, ovate, acute: there is no corolla, except a triple nectariferous rim: the stamina have three filaments, very short: anthers roundish, small: in the female, the calyx is a perianthium as in the male, superior, permanent, very small: there is no corolla, as in the male: the pistillum is a turbinate germ, inferior: style the length of the stamens: stigma three-parted, spreading, (roundish): the pericarpium is a globular berry, one-celled, umbilicated: the seeds bony, globular, filling the pericarpium.

The species cultivated is *O. alba*, Poet's Casia.

It is a very low shrub, seldom rising above two feet high, having woody branches: the leaves long, narrow, of a bright colour: the flowers of a yellowish colour; succeeded by berries, which at first are green, and afterwards turn to a bright red colour, like those of the Asparagus. It is a native of France, &c.

Culture.—These plants are increased, by sowing the berries in autumn as soon as ripe, in some gravelly, stony, or similar situation, on the side of a rising ground, either in the places where the plants are to remain, which is the most successful, or in a nursery-bed for transplanting. As the seeds often remain two years before they vegetate, the places should be kept clear from weeds during that time, or till the plants appear. They afterwards require only to be freed from weeds.

They afford variety in beds, borders, or other places, by the beauty of their fruit.

OTHONNA, a genus containing plants of the shrubby exotic evergreen kind.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, quite simple, one-leafed, blunt at the base, sharp at the end, equal, divided into eight or twelve segments: the corolla compound, rayed: corollets hermaphrodite many, in the disk: females in the ray, the same number with the segments of the calyx, often eight (about ten): proper of the hermaphrodite, tubular, five-toothed, scarcely longer than the calyx: of the female, ligulate, lanceolate, longer than the calyx, three-toothed, reflex: the stamina in the hermaphrodites, filaments five, capillary very short: anther cylindric, tubular, the length of the corollet: the pistillum in the hermaphrodites, germ oblong: style filiform, commonly longer than the stamens: stigma bifid, simple: in the females, germ oblong: style filiform, the same length as in the others: stigma reflex, larger: there is no pericarpium: calyx unchanged, permanent: the seeds in the hermaphrodites none: in the females solitary, oblong, naked or downy: the receptacle is naked, dotted: (somewhat villose in the middle, excavated about the edge.)

The species cultivated are: 1. *O. bulbosa*, Bulbous African Ragwort; 2. *O. pectinata*, Wormwood-leaved African Ragwort; 3. *O. abrotanifolia*, Southernwood-leaved African Ragwort; 4. *O. coronopifolia*, Buckshorn-leaved African Ragwort; 5. *O. cheirifolia*, Stock-leaved African Ragwort; 6. *O. arborescens*, Tree African Ragwort.

The first has a thick shrubby stalk, dividing into several branches, which rise five or six feet high; the leaves come out in clusters from one point, spread on every side; they are smooth, narrow at their base, enlarging gradually to their points, which are rounded; their edges are acutely indented like those of the Holly: from the centre of the leaves arise the foot-stalks of the flowers, which are five or six inches long, branching out into several smaller, each sustaining one yellow radiated flower, shaped like the former; these are succeeded by slender seeds crowned with down. It flowers in May and June.

It is herbaceous, and varies with ovate, quite entire leaves; with the root-leaves pinnate, quite entire; with the leaves linear, very narrow; with the leaves lanceolate, quite entire; with the leaves lanceolate, toothed; with the leaves lanceolate-sub-elliptic; with the leaves

sublanceolate, three-toothed, or shrubby; with the leaves of the top lanceolate, subsessile; and with the leaves alternate, lanceolate, toothed. It is an extremely variable plant.

The second species rises with a shrubby stalk about the thickness of a man's thumb, two or three feet high, dividing into many branches, covered with a hoary down: the leaves hoary, about three inches long and one broad, cut into many narrow segments almost to the midrib; these segments are equal and parallel, and have two or three teeth at the end: the flowers are produced on long axillary peduncles towards the ends of the branches; they have large yellow rays; and are succeeded by oblong purple seeds crowned with down. It flowers in May and June.

The third has a low, shrubby, branching stalk: the leaves are thick, like those of Sampire, and are cut into many narrow segments: the flowers are produced on short peduncles at the ends of the branches, are yellow, and the seeds brown. It flowers from January to March.

The fourth species rises with a shrubby stalk four or five feet high, dividing into several branches: the leaves grayish, placed without order; those on the lower part narrow and entire, but the others indented on the edges: the flowers are produced in loose umbels at the ends of the branches, and are yellow. It flowers from July to September.

The fifth has a strong fibrous root, which shoots deep in the ground, and sends out many woody stems, which spread on every side, and trail upon the ground: the leaves grayish, sessile, and of a thick consistence, narrow at the base, enlarging upwards, and broad at their points, where they are rounded: the flowers are produced upon long, thick, succulent, peduncles at the ends of the branches, and from the axils; they are yellow, the rays sharp jointed, and not much longer than the calyx, which is cut into eight equal segments at top; the disk is large, and the florets as long as the calyx. It is a native of Africa.

The sixth species has the height (at five years of age) of one foot, with a stem the thickness of a human finger, resembling *Sedum arborescens*, and like that fleshy and woody, though never so tall or thick, pliant, covered with a brownish ash-coloured bark, not rough but rather smooth, and having woolly tubercles scattered over it: the branches also have them, and are obliquely curved inwards: the ends of the branches and base of the leaves have a fine wool on them, not conglobated but scattered: the branches are otherwise naked, somewhat woody, covered

with a bark like that of the stem, brownish green towards the end, more tender and herbaceous; these leaves come out alternately at short distances; they are oblong, wider towards the top, and blunt; contracted towards the base, green on both sides, somewhat glittering, and as it were mealy, like those of *Auricula*, flat, thickish, succulent and smooth, veinless, with only a white nerve protuberant underneath, and on the upper part a little hollowed next the base. It is a plant that makes very slow progress in this climate. In August it puts out young leaves, which it keeps all the winter; the heads of flowers appear about the end of November, and do not open till the middle or end of January: in spring the leaves gradually drop off, and the plant appears as if dead till the succeeding autumn.

All the species, except the fifth, are natives of the Cape.

Culture.—These plants may be increased, by planting slips and cuttings of the young shoots or branches during the summer months, in pots filled with fine earth, plunging them in an old tan hot-bed under glasses, carefully shading them from the heat of the sun till perfectly rooted; their striking may be promoted by being covered with small glasses. When they are become well rooted, they should be removed with balls into separate pots filled with loamy mould, placing them in a sheltered shady situation till autumn.

They should be preserved in a good greenhouse in the winter, having as much free air as possible, and in the summer placed in a sheltered warm situation.

The fifth sort may sometimes be preserved in the open ground in such situations.

They produce variety among other potted plants of the green-house kinds.

OXALIS, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Gruinales*.

The characters are: that the calyx is a five-parted perianthium, acute, very short, permanent: the corolla five-parted, often coloring by the claws, erect, obtuse, emarginate: border spreading: the stamina have ten capillary filaments, (awl-shaped,) erect; the outer ones shorter: anthers roundish, grooved: the pistillum is a five-cornered germ, superior: styles five, filiform, the length of the stamens: stigmas blunt: the pericarpium is a capsule, five-cornered, five-celled, ten-valved, (Jacqu.) five-valved gaping at the corners longitudinally: the seeds are roundish, flying out covered with a fleshy elastic aril.

The species cultivated are : 1. *O. Acetosella*, Common Wood Sorrel; 2. *O. stricta*, Upright Wood Sorrel; 3. *O. caprina*, Goat's-foot Wood Sorrel; 4. *O. versicolor*, Striped-flowered Wood Sorrel; 5. *O. purpurea*, Purple Wood Sorrel; 6. *O. incarnata*, Flesh-coloured Wood Sorrel.

There are many other species that may be cultivated.

The first has a perennial root, branched, round, knobbed, creeping, with very fine fibrils on every side, partly white, partly red, having an ovate, acute, thick, rigid scale like a tooth at the knobs: stipe partly subterraneous, partly standing out; sometimes very little, sometimes several inches, then procumbent and striking roots into the ground, toothleted at the knobs like the root, round, somewhat hirsute, red, closely toothleted above with the permanent joints of decayed leaves, perennial, putting forth from its top several aggregate leaves and scapes: the petiole jointed, round, somewhat hirsute, red, especially at bottom, from two to three inches long, almost upright but weak: the leaflets subsessile, near half an inch long, wider, green and hirsute on both sides, shortly ciliate: the scapes one or two, jointed at the base, round, somewhat villose, red, the length of the leaves; with embracing, villose, jointed bractes above the middle: the calycine leaflets oblong, acute, sometimes bifid, somewhat hirsute, ciliate, purple at the tip, upright. It is a native of Europe.

There is a variety with purple flowers.

The second species has a perennial, creeping root, round, putting out capillary fibres at the knobs, branched: the stems from the root as it creeps along several, roundish, slender, somewhat villose, purplish, finally branched, half a foot high and more, upright, but being weak often lying down, annual: the leaves are alternate, a few sometimes opposite, ternate: the petiole springing from a joint margined in front, round, villose, spreading, from two to four inches long, flaccid: the leaflets subpetioled, somewhat hirsute on both sides with decumbent hairs and green, ciliate, scarcely half an inch long: the peduncles axillary, jointed at the base, round, villose, upright, about the same length with the leaves, having from two to seven flowers in an umbel, with a pedicel often branched. It is a native of North America, flowering from June to October.

The third has the bulb ovate-triangular, even: the stipe subterraneous, terminated by an umbel of leaves and scapes: leaves several: the petiole jointed at the base, channelled, smooth, from two to three inches in length: leaflets obcordate, sessile, green above, bright purple underneath, a third part of an inch in length; lobes oblong,

VOL. II.

rounded; the scapes several, smooth, erect, slender, half a foot in length, umbelliferous: the leaflets of the involucre few, acute, minute, smooth: peduncles from two to four, one-flowered, sometimes villose, erect, about an inch in length: the flowers of a yellow colour. It is a native of the Cape.

The fourth species has an ovate bulb, half an inch long, covered with a black skin, within which are frequently several bulbs: hence when cultivated it has almost always many stipes: these are out of the ground, have a few scales on them, are round, slender, have a very few hairs scattered over them, are six inches long, sometimes leafless, sometimes having a single leaf at top, when young almost upright, but afterwards wholly procumbent, terminated by a dense umbel of leaves and flowers: leaves several, upright, and spreading a little: petiole jointed at the base, filiform, villose, from one to two inches in length: leaflets subsessile, wedge-form-linear, emarginate, at the edges and underneath appearing somewhat villose when magnified, above smooth and dotted, underneath having two orange-coloured calluses below the tip, about half an inch in length: the scapes several, jointed at the base, round, a little hirsute at top with capitate hairs, in other parts with simple ones, almost upright, longer than the petioles and twice as thick; bractes alternate, approximating, and ciliated at top with capitate hairs: calycine leaflets lanceolate, acute, erect, ciliate and hirsute with capitate or simple hairs, green with the edges blood-red, and two oblong orange-coloured calluses below the tip connected at top. It is a native of the Cape.

The fifth has also an ovate bulb, loose, small, loosely inclosed in a skin, from three to six times the size of the bulb: the stipe subterraneous, from one to three inches long, round, slender, often bulbiferous, terminated by a dense umbel of leaves and flowers: the leaves very many, spreading or lying on the ground: the petiole jointed at the base, densely villose, pale green, from one to three inches long: the leaflets sessile, quite entire, villose at the edges, quite smooth above, underneath somewhat hirsute and much dotted, always green on both sides without any other colour, half an inch and more in length: scapes several, jointed at the base, round, somewhat villose, pale green, almost upright, longer than the leaves: bractes sublinear, sharp, villose, approximately alternate at bottom: the calycine leaflets lanceolate, acute, hirsute, ciliate, with simple hairs, green with blood-red spots at the edges, erect. It is a native of the Cape.

The sixth species has the bulb in the young plant ovate, covered with a brown skin, twice

2 A

the size of a pea: the root in the mature plant consists of several legs slenderly fusiform, terminating in a long fibre, round, the thickness of a reed and more, some inches in length, fleshy, brittle, pale, somewhat pellucid and sweet: the stipes very many, herbaceous, round, the thickness of a pigeon's quill, or even of a reed, thick, green or purplish brown, a foot and a half high, upright, but so weak as not to be able to support themselves without assistance, at the base and origin of the branches having an ovate-acuminate stipule; both they and the branches terminated by distant umbels of leaves and flowers: the leaves several, at remote distances in whorls: the petiole jointed at the base, round, slender, smoothish, spreading a little, about two inches in length, green: the leaflets on short petioles, equal, quite entire, flat, spreading very much, about half an inch in length, above green and smooth, underneath dotted, more or less purple-flesh-coloured, appearing densely villose in the magnifier, with a row of orange-dots, becoming black in the dried leaves, and observable only in the microscope with the light thrown on it: the peduncles jointed at the base, axillary,

round, pubescent in the magnifier, green, the length of the leaves; with bractes towards the top opposite, erect and jointed: above these nodding and purple.

Culture.—The first sort may be readily increased, by planting the divided roots in a moist shady border in the early spring season; and afterwards they require only to be kept clear from weeds.

The other sorts may be increased, by planting off-sets from the roots or bulbs that come out from the sides of the stems, in pots filled with good light mould, sheltering them in the dry stove or under a frame during the winter, admitting as much free air as possible in mild weather. They only require to be protected in the winter season afterwards, and occasionally removed into other pots.

The two first sorts and varieties may be introduced in the borders, and the others afford variety among other potted plants.

OX-EYE. See BUPHTHALMUM.

OX-SLIP. See PRIMULA.

OXYACANTHA. See BERBERIS.

OXYCEDRUS. See JUNIPERUS.

P Æ O

PÆONIA, a genus comprising plants of the large herbaceous flowery perennial kind.

It belongs to the class and order *Polyandria Digynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a five-leaved perianthium, small, permanent: leaflets roundish, concave, reflex, unequal in size and situation: the corolla has five roundish petals, concave, narrower at the base, spreading, very large: the stamina have numerous filaments, (about three hundred) capillary, short: anthers oblong, quadrangular, erect, four-celled, large: the pistillum consists of two ovate germs, erect, tomentose: styles none: stigmas compressed, oblong, blunt, coloured: the pericarpium has as many capsules, ovate-oblong, spreading and reflex, tomentose, one-celled, one-valved, opening longitudinally inwards: the seeds several, oval, shining, coloured, fastened to the opening suture.

P Æ O

The species are: 1. *P. officinalis*, Common Peony; 2. *P. tenuifolia*, Slender-leaved Peony.

The first has a thick large root, constituted of several thick fleshy tubers, hanging by strings to the main head, with upright round smooth stems, branching half a yard or two feet in height: the leaves are large, many-lobed, with oblong-oval spreading folioles: the flowers large, deep red or purple, on the terminations of the stalks.

There are two principal varieties: the Common Female and Male Peony.

The former of these has the roots composed of several roundish thick knobs or tubers, which hang below each other, fastened with strings: the stalks are green, about two feet and a half high: the leaves composed of several unequal lobes, which are variously cut into many segments: they are of a paler green than those of the latter sort, and hairy on their under side: the flowers are smaller, and of a deeper purple colour.

✓ The latter has the roots composed of several oblong knobs hanging by strings fastened to the main head: the stems the same height with the preceding: the leaves are composed of several ovate lobes, some of which are cut into two or three segments; they are of a lucid green on their upper side, but are hoary on their under: the stems are terminated by large single flowers, composed of five or six large roundish red petals.

The flowers in both sorts appear in May, and are natives of several parts of Europe, as Switzerland, Dauphiné, Carniola, Piedmont, Silesia, &c.

Miller says, that "it is scarcely necessary to observe that the old names of Male and Female have nothing to do here with the sexes, the flowers of both being hermaphrodite."

There are several subvarieties of the *Female Peony* with double flowers, differing in size and colour, cultivated in gardens. The *Male Peony* also varies with pale, and white flowers, and with larger lobes to the leaves: they also vary much in different countries.

"There is the *Foreign Peony*, with a deep-red flower: the roots are composed of roundish knobs, like those of the *Female Peony*: the leaves are also the same, but of a thicker substance: the stalks do not rise so high: the flowers have a greater number of petals, and appear a little later. It is a native of the Levant. The large double purple Peony is probably a subvariety of this."

The *Hairy Peony*, with a larger double red flower: the roots like the common *Female Peony*; but the stalks taller, and of a purplish colour: the leaves much longer, with spear-shaped entire lobes: the flowers large, and of a deep red colour.

The *Tartarian*, with roots composed of oblong fleshy tubers of a pale colour: the stalks about two feet high, pale green: the leaves composed of several lobes, irregular in shape and size, some having six, others eight or ten spear-shaped lobes, some cut into two or three segments, and others entire; of a pale green, and downy on their under side: the stalks are terminated by one flower of a bright-red colour, a little less than that of the common *Female Peony*, having fewer petals.

The *Portugal Peony*, with a single sweet flower, has not roots composed of roundish tubers, but has two or three long taper forked fangs like fingers: the stalk rises little more than a foot high: the leaves are composed of three or four oval lobes, of a pale colour on their upper side, and hoary underneath: the stalk is terminated by a single flower, which is of a bright red co-

lour, smaller than the above, and of an agreeable sweet scent.

The second species has a creeping root, putting forth tuberosus fibres, with tubercles the size of a hazel nut, white, fleshy, of a bitterish taste: the stem scarcely a foot high, and commonly single, but in the garden eighteen inches high, and several from the same root: the root-leaves none: the stem round, very obscurely grooved, smooth, as is the whole plant, naked at bottom, having there only a few sheathing scales: the leaves frequent, alternate, the upper ones gradually less, on a round petiole, channelled above, quinate: the leaflets cut into very many narrow segments: the upper leaves simply multifid: the flower sessile at the uppermost leaf, subglobose, accompanied by two leaflets, one multifid, the other simple, both dilated at the base. It is a native of the Ukraine.

Culture.—The single sorts are easily raised by seed, and the double by parting the roots.

The seed should be sown in autumn, soon after it is perfectly ripened, or very early in the spring, (but the former is the better season,) on a bed or border in the open ground where the soil is rather light, raking it in lightly. It may also be sown in small drills.

The plants should afterwards be properly thinned, kept perfectly free from weeds, and be occasionally watered when the weather is hot and dry.

As they should remain two seasons in the beds, it is necessary in the second autumn to spread some light mould over them, to the depth of an inch; and in the autumn following they may be removed where they are to remain. Plants of the double-flowered kinds are often produced from these.

The roots of the old double-flowered plants may be taken up in the beginning of the autumn, and divided so as to have one bud or eye or more to each part, or crown, as without care in this respect they never form good plants. And where regard is had to the flowering, they should not be too much divided, or the off-sets made too small, as when that is the case they do not flower strong. But where a great increase is wanted, they may be divided more, being left longer in the nursery-beds.

They should be planted out as soon as possible after they are separated, though when necessary they may be kept some time out of the earth. The large off-sets may be set out at once where they are to remain; but the small ones are best set in nursery-beds for a year, or till of proper strength for planting out.

The plants may afterwards be suffered to remain several years unremoved, till the roots are increased to very large bunches, and then be

taken up, when the stalks decay, in autumn, divided, and replanted in their allotted places in the manner directed above.

All the sorts are hardy plants, that are capable of flourishing in any common soil in almost any situation, either in open exposures or under the shade of trees.

The Portugal variety, however, should have a warmer situation and lighter soil than the others.

They are proper ornamental flowery plants for large borders, and may be had at all the public nurseries. In planting, one should be put here and there in different parts, placing them with the crowns of the roots a little within the surface of the earth, and at a yard at least distant from other plants, as they extend themselves widely every way, assuming a large bushy growth; and, together with their conspicuous large flowers, exhibit a fine appearance, and are often planted at the terminating corners of large borders adjoining principal walls, displaying a bushy growth in their foliage and flowers. When the flowers are gone, the capsules opening lengthways discover their coloured seeds very ornamentally, especially in that called the Male Peony and varieties. And to forward this, the capsules may be slit open on the inside at the proper valve; whereby they will expand much sooner, and display their beautiful red seed more conspicuously.

PAINTED LADY PEA. See **LATHYRUS**.

PALM TREE. See **CHAMÆROPS** and **COCOS**.

PALMA CHRISTI. See **RICINUS**.

PALMETTO. See **CHAMÆROPS**.

PANAX, a genus containing plants of the herbaceous and shrubby perennial kinds.

It belongs to the class and order *Polygamia Dioecia* (*Pentandria Digynia*), and ranks in the natural order of *Hederaceæ*.

The characters are: that in the hermaphrodite flowers the calyx is a simple umbel, equal, clustered; involucre many-leaved, awl-shaped, small, permanent; perianthium proper, very small, five-toothed, permanent; the corolla universal uniform; proper, of five oblong equal recurved petals; the stamina have five filaments, very short, caducous; anthers simple; pistillum a roundish germ, inferior; styles two, small, upright; stigmas simple; the pericarpium is a cordate berry, umbilicate, two-celled: the seeds solitary, cordate, acute, plano-convex: male flowers on a distinct plant: the calyx is a simple umbel, globular; with very many equal coloured rays: involucre composed of lanceolate sessile leaflets, the same number with the external rays; perianthium turbinate, quite entire, coloured: the corolla has five petals, oblong, blunt, narrow, reflex, placed on the perianthium: the stamina have five filaments, filiform, longer, inserted into the perianthium: anthers simple.

1

The species cultivated are: 1. *P. quinquefolia*, Ginseng; 2. *P. trifolia*, Three-leaved Panax; 3. *P. aculeata*, Prickly Panax.

The first has a fleshy taper root as large as a man's finger, jointed, and frequently divided into two branches, sending off many short slender fibres: the stalk rises near a foot and half in height, and is naked at the top, where it generally divides into three smaller foot-stalks, each sustaining a leaf composed of five spear-shaped leaflets, serrate, pale green and a little hairy: the stalk is erect, smooth, round, simple, tinged of a deep purple colour: the leaves arise with the flower-stem from a thick joint at the extremity of the stalk; are generally three, but sometimes more: the five leaves into which each of these is divided are of an irregular oval shape, veined, pointed, smooth, deep green above, on short foot-stalks, from a common petiole, which is long, round, and almost erect: the flowers grow on a slender peduncle, just at the divisions of the petioles, and are formed into a small umbel at the top; they are of an herbaceous yellow colour, and appear at the beginning of June: the berries are first green, but afterwards turn red; and inclose two hard seeds, which ripen in the beginning of August, or soon afterwards. It is a native of Chinese Tartary.

The second species has the stem single, not more than five inches high, dividing into three foot-stalks, each sustaining a trifoliate leaf, with the leaflets longer, narrower, and more deeply indented on their edges than in the first species: the flower-stalk rises, as in that, from the divisions of the petiole. It is a native of North America.

It is so nearly allied to the first sort, that Linnaeus doubts whether it be any thing more than a variety of that, only much smaller.

The third is a shrub with a recurved prickly at the base and at the tip of the petioles: the leaves are solitary, ternate, tern at the flowers; with ovate, blunt leaflets: the umbels are peduncled, hemispherical, and simple: the flowers with three styles. It is a native of China.

Culture.—The first and second sorts are increased by sowing the seeds procured from abroad upon a moderate hot-bed, or in pots plunged into it, in the early spring season; and when the plants have acquired a few inches in growth, removing them into beds or borders where the mould is good, and the situations sheltered.

The third sort is increased by layers or cuttings, laid down or planted out in the summer months in pots, and plunged in the bark-bed of the stove. When they have stricken root, they may be removed into separate pots, and be constantly kept in the stove.



Painted by Syd Edwards

London Published June 1 1873. by G. Kearsley Fleet Street

Engraved by F. Nankin

Pancratium maritimum.
See *Pancratium*

Soldanella alpina
² *Alpine Soldanella*

The two first sorts afford variety in the borders, and the last among stove collections.

PANCRATIUM, a genus containing plants of the bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx is an oblong spathe, obtuse, compressed, opening on the flat side, shrivelling: the corolla has six petals, lanceolate, flat, inserted into the tube of the nectary on the outside above the base: nectary one-leaved, cylindric-funnel-form, coloured at top, with the mouth spreading and twelve-cleft: the stamina have six filaments, awl-shaped, inserted into the tips of the nectary, and longer than they are: anthers oblong, incumbent: the pistillum is a bluntly three-cornered germ, inserted into the filaments, longer than the stamina: style short: the pericarpium is a roundish capsule, three-sided, three-celled, three-valved: the seeds several, globular.

The species cultivated are: 1. *P. maritimum*, Sea Pancratium; 2. *P. Illyricum*, Illyrian Pancratium; 3. *P. Zeylanicum*, Ceylon Pancratium; 4. *P. Mexicanum*, Mexican Pancratium; 5. *P. Caribæum*, Caribbean Pancratium; 6. *P. Carolinianum*, Carolina Pancratium; 7. *P. Amboinense*, Broad-leaved Pancratium; 8. *P. verecundum*, Narcissus-leaved Pancratium.

The first has a large, coated, bulbous root, of an oblong form, covered with a dark skin: the leaves are shaped like a tongue; are more than a foot long, and one inch broad, of a deep green, six or seven of them rising together from the same root, encompassed at bottom with a sheath: between these arises the stalk, which is a foot and half long, naked, sustaining at the top six or eight white flowers, inclosed in a sheath, which withers and opens on the side, to make way for the flowers to come out.

According to Mr. Miller, the root resembles that of the Squill, but is less, covered with a brown skin, and white within, the coats pellucid and gently striped, viscid or full of a clammy juice, bitter to the taste without acrimony. It is a native of the South of Europe.

The second species has a large bulb, covered with a dark skin, sending out many thick strong fibres, striking deep in the ground: the leaves are a foot and half long and two inches broad, of a grayish colour: the scapes thick, succulent, near two feet high: the flowers six or seven, white, shaped like those of the first sort, but with a shorter tube, and much longer stamina. It flowers in June, and frequently produces seeds. It is a native of the South of Europe.

The third has a pretty large bulbous root: the

leaves long and narrow, of a grayish colour, and pretty thick, standing upright: the stalk rises among them, a foot and half high, naked, sustaining one flower at the top: the nectary is large, cut at the brim into many acute segments: the stamina long, and turning towards each other at their points; in which it differs from the other species: the flower has a very agreeable scent, but is of short duration. It is a native of Ceylon.

The fourth species has the stem or scape a long span in height, round, forked towards the top, or dividing into two peduncles, with two oblong tender membranaceous greenish leaflets, and terminated each with a white flower, divided to the very base into six narrow segments; in the middle of these is a white bell-shaped tube, which Linnæus names the nectary, more tender than the petals; the mouth angular, and from each angle putting forth a filament, long, slender and white, terminated by an oblong incurved saffron-coloured anther: the flowers have no smell, and shrivel up over the fruit: leaves four, reclining, smooth, pale green and somewhat glaucous, ridged, slightly grooved in the middle, and with a single streak on each side, otherwise veinless, a long span or a little more in length, an inch or an inch and half in width, produced to a point at the end. It flowers in May.

The fifth has the leaves about a foot long and two inches broad, having three longitudinal furrows: the stalk rises about a foot high, then divides like a fork into two small foot-stalks, or rather tubes, which are narrow, green, and at first encompassed by a thin spathe, which withers, and opens to give way to the flowers: these are white, and have no scent. It is a native of the West Indies.

The sixth species has a roundish bulbous root, covered with a light brown skin, from which arise several narrow dark green leaves, about a foot long: among these comes out a thick stalk (scape) about nine inches high, sustaining six or seven white flowers, with very narrow petals, having large bell-shaped nectariums or cups, deeply indented on their brims: the stamina do not rise far above the nectarium. It is a native of Jamaica and Carolina.

The seventh has the bulb oblong, white, sending out several thick fleshy fibres, which strike downward: the leaves are on very long foot-stalks, some ovate, others heart-shaped, about seven inches long and five broad, ending in points, having many deep longitudinal furrows; they are of a light green, and their borders turn inwards: the stalk thick, round, and succulent, rising near two feet high, sustaining at the top several white flowers, shaped like those of:

the other sorts; but the petals are broader, the tube is shorter, and the stamens are not so long as the petals: there is a thin sheath, which splits open longitudinally. It is a native of Amboyna.

There are several varieties: as the *American*, which grows naturally in the islands of the West Indies, where it is called *White Lily*; and the *latifolium* and *ovatum* also grow naturally in the same place.

The eighth species has the leaves a foot and a half long, half an inch wide: the scape erect, compressed, a foot high: the spathes oblong-lanceolate, acuminate, whitish, shrivelling; the outer larger, an inch and half in length: the flowers fragrant, on three-cornered pedicels, scarcely half an inch long. It is a native of the East Indies; flowering from June to August.

Culture.—All these plants are capable of being increased by planting off-sets from the roots in the latter end of summer, when their stems and leaves decay. The roots may be divided every second or third year.

In the two first sorts, the off-sets may be planted out in nursery-beds for a year or two, to become sufficiently strong, when they may be removed into warm sheltered dry borders; the first being sheltered from frost in severe winters, and the latter in very severe weather, by being covered with tanner's bark, straw, or peas-haulm. The second sort may also be increased by seeds sown in pots, and plunged in a hot-bed.

The other sorts must be planted out in small pots filled with light earth, separately plunging them in the bark-bed of the stove. They should be kept constantly in the tan-bed, and have the management of other tender bulbs. In this way they generally succeed well.

The two first sorts afford variety in the dry warm borders of the pleasure-ground, and the other kinds produce variety as well as fragrance in the stove collections.

PANDANUS, a genus containing a plant of the herbaceous perennial exotic kind, for the stove.

It belongs to the class and order *Dioecia Monandria*.

The characters are: that in the male the calyx has alternate spathes, sessile, serrate-pointy: spadix decomposed, naked: perianthium proper none: corolla none: the stamens have very many filaments, solitary, placed scatteredly on the outer ramifications of the spadix, very short: anthers oblong, acute, erect: in the female, the calyx has four spathes, terminating, converging: spadix globular, covered with numerous fructifications, scarcely included: perianthium none: there is no corolla: the pistillum has numerous aggregate

germs, sessile, five-cornered, convex at top, smooth: style none: stigmas two, cordate, margined: the pericarpium a sub-globular fruit, large, consisting of numerous wedge-shaped drupes, convex at top, angular, farinaceous, one-seeded: the seed solitary, oval, even, in the centre of the drupe.

The species is *P. odoratissimus*, Sweet-scented Pandanus, or Screw Pine.

This is sometimes found with a single and pretty erect trunk of ten feet in height, and a branching round head; but is generally in form of a very large, branching, spreading bush. From the stems or larger branches issue large carrot-shaped blunt roots, descending till they come to the ground, and then dividing: the substance of the most solid is something like that of a cabbage stalk, and by age acquires a woody hardness on the outside: the leaves are confluent, stem-clasping, closely imbricated in three spiral rows, round the extremities of the branches, bowing from three to five feet long, tapering to a very long fine triangular point, very smooth and glossy; margins and back armed with very fine sharp spines; those on the margins point forward; those of the back point sometimes one way, sometimes the other.

The male flowers are in a large, pendulous, compound, leafy raceme, the leaves of which are white, linear-oblong, pointed and concave.

The female flowers are on a different plant, terminating and solitary, having no other calyx or corolla than the termination of the three rows of leaves forming three imbricated fascicles of white floral leaves, like those of the male raceme, which stand at equal distances round the base of the young fruit. It is a native of the warmer parts of Asia, flowering chiefly during the rainy season; it is much employed there for hedges, and answers well, but takes much room. The tender white leaves of the flowers, chiefly those of the male, yield that most delightful fragrance for which they are so generally esteemed; and of all the perfumes, it is by far the richest and most powerful.

Culture.—This plant may be increased by sowing the seeds, brought from the places where it grows naturally, in pots of light earth, and plunging them in the bark-bed of the stove, where they must be constantly retained, having the management usually practised for other tender exotic plants.

They have a fine ornamental effect among other stove plants, in their large spreading foliage.

PAPAVER, a genus containing plants of the hardy herbaceous fibrous-rooted annual and perennial kinds,



Painted by Ed Edwards

London Published Feb 1 1860 by G Kearsley Fleet Street

Engraved by F Sanford

1 *Papaver Orientale*
Eastern Poppy

2 *Pulmonaria virginica*
Virginia Lung-wort

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rhodalece*.

The characters are: that the calyx is a two-leaved perianthium, ovate, emarginate: leaflets subovate, concave, obtuse, caducous: the corolla has four roundish petals, flat, spreading, large, narrower at the base; alternately less: the stamina have numerous filaments, capillary, much shorter than the corolla: anthers oblong, compressed, erect, obtuse: the pistillum has a roundish, large germ: style none: stigma peltate, flat, radiate: the pericarpium is a crowned capsule, with the large stigma, one-celled, half-many-celled, opening by many holes at the top under the crown: the seeds numerous, very small: receptacles, longitudinal plait, the same number with the rays of the stigma, fastened to the wall of the pericarpium.

The species cultivated are: 1. *P. somniferum*, White Poppy; 2. *P. Rhoeas*, Corn or Red Poppy; 3. *P. Cambricum*, Welsh Poppy; 4. *P. Orientale*, Oriental Poppy.

The first has the stalks large, smooth, five or six feet high, branching: the leaves large, grayish, embracing at the base, irregularly jagged on their sides: the flowers terminating, whilst inclosed in the calyx hanging down, but before the corolla expands becoming erect: the calyx is composed of two large oval grayish leaves, that separate and soon drop off: the corolla is composed of four large, roundish, white petals, of short duration; and succeeded by large roundish heads as big as Oranges, flattened at top and bottom, and having an indented crown or stigma: the seeds are white. It is a native of the southern parts of Europe, but probably originally from Asia.

There are several varieties, differing in the colour and multiplicity of their petals, which are preserved in gardens for ornament: the Single-flowered sort is chiefly cultivated for use.

The Common Black variety of Poppy has stalks about three feet high, smooth, and dividing into several branches: the leaves are large, smooth, deeply cut or jagged on their edges, and embracing: the petals purple with dark bottoms; succeeded by oval smooth capsules filled with black seeds, which are sold under the name of *Maw-seed*.

Of this there are many sub-varieties: as with large double flowers, variegated of several colours; with red and white, purple and white, and some finely spotted like Carnations.

There are few plants whose flowers are so handsome; but as they have an offensive scent, and are of short duration, they are not in ge-

neral much regarded: they are annual, flowering in June.

The second species has the stem from one to two feet high, upright, round, branched, purplish at bottom, with spreading hairs, bulbous at the base: the leaves are sessile, forming a kind of sheath at bottom, hairy on both sides; the segments or leaflets unequally toothed or serrate, each tooth rolled back at the edge, callous at top, and terminated by a small spine: the peduncles long, round, upright, one-flowered, red, the hairs on it spreading horizontally. It is a native of every part of Europe, &c. flowering from June to August.

There is a variety with an oval black shining spot at the base of each petal, from which many beautiful garden sub-varieties are produced which have double flowers, white, red bordered with white, and variegated.

In the third the stalks are a foot high, and smooth: the pinnae of the leaves are deeply cut on their edges; and there are a few small leaves on the stalk shaped like the lower ones: the upper part of the stalk is naked, and sustains one large yellow flower, appearing in June; being filled with small purplish seeds. It is a native of Wales, &c.

The fourth species has a perennial root, composed of two or three strong fibres as thick as a man's little finger, a foot and a half long, dark brown on the outside, full of a milky juice, which is very bitter and acrid: the leaves a foot long, closely covered with bristly white hairs: the stems two feet and a half high, very rough and hairy, having leaves towards the lower part like the root-leaves, but smaller: the upper part is naked, and sustains at the top one very large flower, of the same colour with the common red sort. It was found in Armenia, and flowers here in May.

There are a few varieties, differing in the colour of the flowers; and it is said that the flower is sometimes double, but with us it is always single.

Culture.—All the different sorts may be increased by seeds, and the two last sorts also by parting and planting out the roots.

The seeds should be sown in the autumn, or very early in the spring, (but the former is the better season,) either in the places where the plants are to grow, or in beds, to be afterwards planted out. The first is probably the best method, as these plants do not bear removing well.

When they are cultivated for ornament, seed of the finest double sorts should be carefully provided and made use of, and be sown in patches.

In the practice of Mr. Ball in cultivating the first:

sort for the purpose of preparing opium from it, "the seed was sown at the end of February, and again the second week in March, in beds three feet and a half wide, well prepared with good rotten dung, and often turned or ploughed, in order to mix it well, and have it fine, either in small drills, three in each bed, or broadcast; in both cases, thinning out the plants to the distance of a foot from each other, when about two inches high, keeping them free from weeds." They produced from four to ten heads each, and showed large flowers of different colours. "With an instrument something like a rake, but with three teeth, the drills may, he says, be made at once." He found that the plants did not bear transplanting; as, out of 4000 which he transplanted, not one plant came to perfection.

The roots of the two last sorts may be divided in the autumn, or spring, (but the first period is the better,) leaving some root fibres to each parting, planting them out where they are to remain, as soon afterwards as possible.

In all the sorts the plants only require afterwards to be kept free from weeds, and those raised from seed properly thinned out.

They all afford ornament and variety in the clumps, borders, and other parts of pleasure grounds and gardens; and the first sort may sometimes be grown to advantage for the purpose of having the juice which it affords made into opium.

PAPAW-TREE. See **CARICA**.

PAPER-FRAMES, such as are formed with oiled paper upon a slight frame-work of thin slips of wood.

They are useful for several purposes in the early spring and summer season; such as in defending late hot-beds, and sometimes in particular natural ground beds of curious tender plants, seeds, cuttings, &c.

In making them when formed as above, either in a ridge manner, with two sloping sides, longways, or arch-fashion, in dimensions from five to ten feet in length, three to four in width, and two to three feet in perpendicular height; the wood-work is covered with large sheets of strong white paper pasted on securely, and when dry, brushed over regularly with linseed oil, to resist and shoot off the falling wet of rains and dews, and to render them more pellucid, so as to admit the rays of light and the heat of the sun in a proper degree. When thus prepared and perfectly dry, they are ready for placing over the beds, for the purposes required; in which the paper continues durable generally only one season; but the frame-work will last several years, by being fresh papered.

These kinds of temporary Frames are also useful in some of the hand-glass crops of melons, and occasionally in those of cucumbers, but more generally in the former; which after having advanced in growth, to fill and extend beyond the compass of the hand-glasses, they should be removed, and the Paper-frames placed over the bed, covering it wholly in width and length, the runners of the plants being trained out regularly along the surface; continuing them constantly over the plants, which are thereby protected from external injuries, and inclement weather, either cold or excessive rains, winds, &c., likewise from the too powerful heat of the sun. See **CUCUMIS MELO**.

They may also be used for late hot-bed cucumbers, when in want of garden-frames or hand-glasses for the purpose, being placed over the bed, at once, finally to remain: and with proper care in giving occasional air, water, and covering over the frames with mats in cold nights, and very hard rains, &c., cucumbers may be raised in a tolerable manner.

They may likewise be employed occasionally, in default of others, in the raising most of the less hardy or tenderer annuals, both in sowing them in hot-beds and warm borders of natural earth.

Paper-frames may likewise be used advantageously in pricking-out many sorts of small tender seedling plants in the hot summer months, to defend them from casual unfavourable night air, heavy rains, &c., and afford a fine growing shade from the hot rays of the mid-day sun. The same kind of frames may still further be beneficial in raising many sorts of tender exotics, from small cuttings and slips in summer, both of the woody, herbaceous and succulent kinds, either planted in hot-beds or in the natural earth, as the different kinds may require; which being covered close with them, they exclude the outward air, admit the light and influence of the sun in a proper degree, and at the same time afford a peculiar kindly shade.

They are chiefly made in the forms mentioned above, in an open manner, having the ribs or spars twelve inches asunder, first forming a bottom frame, rather stronger than the other parts, with a ridge-piece supported at a proper height, extending longways in the middle; then narrow side rafters, arranged from the bottom to the ridge rail at top, a foot distant, both for the advantage of pasting the paper regularly, and to admit a proper degree of light between them, through the paper: but when of great length, it is proper to have one or two pannels on one side, eighteen inches or two feet in width, to open outward with hinges, convenient

for admitting air, and performing other occasional culture: the whole being thus formed in the wood work, it is then proper to extend lines of packthread cross-ways of the ribs, going round each, level or even with the upper surface of the frame, continuing two or three rows a foot asunder, from the lower part upward, drawing other lines, crossing and intersecting these at the same distance, regularly between the ribs of the frame-work; which arrangement of the lines is of essential service for the more effectual support of the paper when pasted on the frame, and strengthening it against the power of winds and heavy rains. The paper for this use should be of the larger strong printing or demy kind; which, previously to pasting on the frame, should be moderately damped with water, that it may not sink in hollows after being fixed; and as soon as thus prepared it should be pasted on, sheet and sheet, in a regular manner, one large sheet and a half, or two at most, generally ranging from bottom to top, contriving to have whole ones along the ridge-rails above, extending lengthways and across, placed conveniently to join regularly with the other sheets below; and if, at the intersections of the packthreads, a small square or round bit of the same paper be pasted on the inside to the main sheets over that part of the packthread, it will give it additional strength against rain and wind.

When the paper is thus pasted on, and perfectly dry, it must be oiled over with linseed oil, either raw or boiled: the latter is however rather apt to harden the paper, and more liable to crack or break: it may be applied by means of a painter's soft clean brush, dipping lightly, and brushing the outside of the paper all over, equally in every part; then placing the frame in some dry covered shed, to remain till the whole is thoroughly dry; when it may be used.

Though these sorts of frames may be cheap, and answer many little purposes of the gardener, they are not by any means so useful as those made with glass.

PARIETARIA, a genus containing a plant of the shrubby kind for the green-house.

It belongs to the class and order *Polygamia Monœcia*, and ranks in the natural order of *Scabridæ*.

The characters are: that the hermaphrodite flowers are two, contained in a flat six-leaved involucre: the two opposite and outer leaflets larger: the calyx is a one-leaved perianthium, four-cleft, flat, blunt, the size of the involucre halved: there is no corolla, unless the calyx be called so: the stamina have four awl-shaped filaments, longer than the flowering perianthium and expanding it, permanent: anthers twin:

VOL. II.

the pistillum is an ovate germ: style filiform, coloured: stigma penciliform, capitate: there is no pericarpium: perianthium elongated, larger, bell-shaped, the mouth closed by converging segments: the seed one, ovate: female flower one, between the two hermaphrodites, within the involucre: the calyx as in the hermaphrodites: there is no corolla: the pistillum as in the hermaphrodites: there is no pericarpium: perianthium thin, involving the fruit: the seed, as in the hermaphrodites.

The species cultivated is *P. arborea*, Tree Pellitory.

It is an upright soft shrub, the height of a man: the root woody, branched, fibrous, rufescent: the stem woody, upright, round, the bark full of clinks, ash-coloured: branches and branchlets alternate, spreading, villose, pithy: the shoots red, very villose with hoary hairs: the leaves alternate, spreading, entire, nerved, three-nerved above the base, veined: nerves and veins prominent underneath, grooved above, somewhat wrinkled, the younger ones very much so, underneath villose soft, above bright green, scarcely paler beneath, from four to six inches long, and from two to four wide: the flowers commonly three, clustered, from the axil of each bracte, sessile, in the male yellow, in the female red herbaceous. According to L'Heritier, the male and female flowers are on different plants. It is a native of the Canary islands, flowering from February to May.

Culture.—This may be increased by planting cuttings of the young shoots in the summer season, watering them occasionally till they have stricken root. When the plants are well rooted, they may be removed with balls about their roots into separate pots, and have the constant protection of the green-house.

They afford variety in these collections.

PARKINSONIA, a genus containing a plant of the exotic flowering tree kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lamentaceæ*.

The characters of which are: that the calyx is a one-leaved perianthium; at the base bell-shaped flattish, permanent: border five-parted: segments lanceolate-ovate, acute, coloured, reflex, almost equal, deciduous: the corolla has five petals, with claws, almost equal, spreading very much, ovate: the lowest kidney-form: claw upright, very long: the stamina have ten awl-shaped filaments, villose below, declined: anthers oblong, incumbent: the pistillum is a round germ, long, declined: style filiform, rising, the length of the stamens: stigma blunt: the pericarpium is a legume very long, round,

swelling over the seeds, (whence it is necklace-form,) acuminate: the seeds several, one to each joint of the legume, oblong, subcylindric, blunt.

The species is *P. aculeata*, Prickly Parkinsonia.

It is a small tree, with a trunk ten or twelve feet high, unarmed, even: the branches long, subdivided, flexuose, prickly, strict: the prickles two opposite at the sides of the petioles, one between them three times as long as the others, awl-shaped, upright: the leaves alternate, in fours from the same bud, pinnate, very long, linear: general petioles linear, thicker at the base, flat, somewhat convex, spreading, very smooth: leaflets extremely small, on very short petioles, ovate, smooth: racemes terminating and axillary, solitary, shorter than the leaves, erect, (eight to ten,) many-flowered: flowers alternate, scattered, yellow, on long peduncles. In Jamaica it is called *Jerusalem Thorn*. It was first introduced there from the main, but now grows wild in many parts, and in the other islands of the West Indies, where it was originally cultivated for inclosures: it seldom rises above eight feet in height, and is well supplied with strong thorns on every part: the branches are flexible and small, and the trunk seldom grows to any considerable thickness. It flowers several times in the year, and is said to bear long slender bunches of yellow flowers, hanging down like those of laburnum: they perfume the air to a considerable distance; for which reason the inhabitants of the West Indies plant them about their houses.

Culture.—It is capable of being increased by sowing the seeds in pots filled with light rich mould, early in the spring season, plunging them in a hot-bed. When the plants have attained a few inches in growth, they should be carefully removed into other small pots, separately re-plunging them in the hot-bed, shading them till fresh rooted, when fresh air should be admitted according to the warmth of the season. The only method by which these plants have been kept with success through the winter, in this climate, has been by hardening them in July and August to bear the open air; and in September placing them on shelves in the dry stove, at the greatest distance from the fire, so that they may be in a very temperate state of warmth.

These plants afford ornament among other potted plants of the stove kind.

PARTERRE, a spacious level plot of ground in the pleasure garden, divided into many little partitions of different figures and dimensions; by means of edgings or lines of dwarf-box, or by verges of grass turf, with fine gravel walks between, &c. This sort of works were formerly in great

estimation, and were commonly situated directly in the front of the house, generally the whole width and sometimes more, extending proportionably in length: and where the intermixture of the figures is artfully disposed, they strike the eye very agreeably, and afford an ornamental effect at all seasons.

The general figure of a Parterre is an oblong or long square, about as long again as broad: a level open spot in some conspicuous part, as above, is mostly chosen for the purpose: first forming a long bed or border of earth, all round, for a boundary; the internal space within this border being then traced out into various little partitions, or inclosures, artfully disposed into different figures corresponding to one another, such as long squares, triangles, circles, various scroll-works, flourishes of embroidery, and various other devices; all of which are formed either by lines of dwarf-box, with intervening alleys and tracks of turf, sand, fine gravel, small shells, &c. as above, or formed sometimes entirely of verges of fine turf, disposed into wide or narrow compartments, as the figure may require: and sometimes they consist of box-edgings, and tracks of turf together; the partitions or beds of earth formed by the tracks of box and turf, &c., being planted with some choice flowers; but no large plants to hide the form, as the regularity of it, in the artful distribution of the different figures, is intended as a decoration to the whole place long after the season of the flowers is over. Some prefer Parterres composed entirely of turf and beds of earth, perfectly even, without any other figure than the long square, forming a border of earth all round, within which are spots of grass, and beds or borders of earth of different sizes. And sometimes Parterres, with box-edgings, are formed into labyrinths or mazes; and some are made to represent coats of arms with the proper supporters. All crowded designs, however, lose their effect.

Works of this sort are now almost wholly in disuse in this country: however, for the sake of variety, they may still be admitted, though not immediately in the front of the house.

PARTING ROOTS, the practice of dividing the roots of some sorts of plants in order to their being set out; which is an expeditious mode of increasing a great number of fibrous-rooted perennial plants. A great number of herbaceous, fibrous, and tuberous-rooted perennial plants often increase by the root into large clusters or bunches, composed of numerous small slips or off-sets, particularly many of the flowery tribe, such as the campanula, perennial sunflower, golden-rod, perennial aster, polyanthus, and daisy, balm, mint, burnet, cives, and penny-

royal, with innumerable other sorts; which from one small slip or off-set of the root, often in a season or two multiply into a large cluster of such off-sets; and these clusters of roots being parted into several separate slips, with root-fibres at their bottom, and one or more buds at top, each commences a distinct plant; so that, by parting the roots in this way, one plant may instantly be multiplied into many, each of which becomes alike in growth and general habit to the original, and all flower the ensuing season in their due course; and in their turns detach from their sides all around, a due supply of off-sets for further propagation.

The best general season for Parting Roots is in the latter end of summer or autumn, after they have done flowering, and the stalks are decayed; which is in August, and the two following months; in which, when the detached off-sets are planted directly, they will take good root before winter. But in many hardy sorts it may be performed almost any time, in open weather, from September till March; and some of the tender kinds succeed best in spring. In these cases it should, however, be done before they begin to shoot forth their stalks or advance considerably in their spring shoots.

In performing the business, when any plant designed to be increased has multiplied by its roots into a cluster of off-sets, the whole may either be taken up entirely, and the root parted into as many slips as are furnished with fibres, &c., or a quantity of slips may be detached from the sides all around as the parent plant stands in the ground: in either method, the work may in many sorts be effected easily with the hand; and in others by the assistance of a knife, &c. And when it is wanted to make as great an increase as possible, the root may be parted into as many slips as may be convenient, provided each is furnished with some fibre or root-part, and crowned with one or more buds or eyes for forming shoots at top. But in the flowery tribe, when the detached off-sets are wanted for flowering as strong as possible the ensuing season, they should not be parted too small, but into middling-sized slips, where practicable; which being planted in the proper places will flower in tolerable perfection in the following season. The slips should generally be planted directly by dibble; the very small ones in nursery-beds to stand till next autumn, to acquire strength: then transplanted with balls into the places where they are to remain; but the larger ones at once where they are to grow.

This method may be practised in many sorts annually, as numbers of the herbaceous perennials multiply in one season into large bunches.

PARSLEY. See *APIUM*.

PARSNIP. See *PASTINACA*.

PARTHENIUM, a genus containing plants of the annual and perennial kinds.

It belongs to the class and order *Monoecia Pentandria*, and ranks in the natural order of *Nucamentaceæ*.

The characters are: that the calyx is a common quite simple perianthium, five-leaved, spreading: leaflets roundish, flat, equal: the corolla compound convex: corollets hermaphrodite many in the disk: females five in the ray, scarcely surpassing the others: proper of the hermaphrodites one-petalled, tubular, erect, with the mouth five-cleft, the length of the calyx: of the females one-petalled, tubular, ligulate, oblique, blunt, roundish, the same length with the other: the stamina in the hermaphrodites—filaments five, capillary, the length of the corollet: anthers as many, thickish, scarcely cohering: the pistillum of the hermaphrodite—germ below the proper receptacle, scarcely observable: style capillary, generally shorter than the stamens: stigma none: of the female, germ inferior, turbinate-cordate, compressed, large: style filiform, the length of the corollet: stigmas two, filiform, the length of the style, spreading a little: there is no pericarpium: calyx unchanged: seeds in the hermaphrodites abortive: in the females solitary, turbinate-cordate, compressed, naked: the receptacle scarcely any, flat: chaffs separate the florets, so that each female has two hermaphrodites behind.

The species are: 1. *P. Hysterophorus*, Cut-leaved Parthenium, or Bastard Feverfew; 2. *P. integrifolium*, Entire-leaved Parthenium.

The first is an annual plant, growing wild in great plenty in the island of Jamaica, where it is called Wild Wormwood; and thrives very luxuriantly about all the settlements in the low lands. It is observed to have much the same qualities with Feverfew. It flowers here in July and August.

The second species is a perennial plant, which dies to the ground every autumn, and shoots up again the following spring. It rises three feet and more, with thick, round, fleshy stems: the leaves half-embracing, hirsute, not hairy, somewhat paler underneath, with frequent oblique veins or nerves: root-leaves large and long, on keeled petioles: the flowers grow in a corymb at the ends of the stem and branches: the heads are snow-white above, like those of *Gnaphalium*, whitish green below, and villose at first. It is a native of Virginia, flowering in July, but seldom produces good seeds in this climate.

Cultura.—The first sort may be increased by

sowing the seeds on a hot-bed early in the spring; and when the plants come up, transplanting them upon another hot-bed, about five or six inches distant, giving them water and shade until they have taken new root; after which, they must have a pretty large share of fresh air in warm weather, by raising the glasses of the hot-bed every day, and be duly watered every other day at least. When the plants have grown so as to meet each other, they should be carefully taken up, preserving a ball of earth to their roots, and each planted into a separate pot filled with light rich earth; and be plunged into a moderate hot-bed till fresh rooted; after which they may be exposed, with other hardy annual plants, in a warm situation, where they will flower in July: but if the season should prove cold and wet, it will be proper to have a plant or two in shelter, either in the stove, or under tall frames, in order to have good seeds, if those plants which are exposed should fail.

The second sort may be increased by parting the roots in autumn, and be planted in the full ground, where it will abide the cold of our ordinary winters.

They afford ornament in the borders and among potted plants.

PASQUE-FLOWER. See ANEMONE.

PASSERINA, a genus containing plants of the shrubby exotic evergreen kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Veprculæ*.

The characters are: that there is no calyx: the corolla is one-petalled, shrivelling: tube cylindrical, slender, ventricose below the middle: border four-cleft, spreading: segments concave, ovate, blunt: the stamina have eight filaments, bristle-shaped, the length of the border, placed upon the point of the tube: anthers subovate, erect: the pistillum is an ovate germ, within the tube of the corolla: style filiform, springing from the side of the very point of the germ, the same length with the tube of the corolla: stigma capitate, hispid all over with villose hairs: the pericarpium is coriaceous, ovate, one-celled: the seed single, ovate, acuminate at both ends, with the points oblique.

The species cultivated are: 1. *P. filiformis*, Filiform Sparrow-wort; 2. *P. hirsuta*, Shaggy Sparrow-wort; 3. *P. capitata*, Headed Sparrow-wort; 4. *P. ciliata*, Ciliated Sparrow-wort; 5. *P. uniflora*, One-flowered Sparrow-wort.

The first rises with a shrubby stalk five or six feet high, sending out branches the whole length, which, when young, grow erect, but as they advance in length, they incline towards

a horizontal position; but more so, when the small shoots at the end are full of flowers and seed-vessels: the branches are covered with a white down like meal, and are closely beset with very narrow leaves in four rows, so that the young branches seem as if they were four-cornered: the flowers come out at the extremity of the young branches, from between the leaves, on every side, are small and white, so that they make no great appearance. It is a native of the Cape, flowering from the month of June to August.

The second species has shrubby stalks, which rise to a greater height than the former: the branches grow more diffused, and are covered with a mealy down: the leaves imbricate, short, thick, succulent, smooth and green on the outside, but downy on the inner: the flowers small and white, like those of the former, appearing about the same time. It is a native of Spain and Portugal.

The third has the leaves scattered: the heads terminating, globular: the peduncles tomentose, thickened: the flowers many, white, sessile without a tube: the stamens above the throat sixteen, the eight inner of which are castrated: stems shrubby, compound, with rod-like red branches: the leaves erect, acuminate: the common peduncles from the end of the branches, turbinate, tomentose. It is a native of the Cape.

The fourth species has a shrubby stalk, rising five or six feet high, sending out many branches which are naked to their ends, where they have oblong leaves, standing erect, and having hairy points: the flowers are small, white, and come out among the leaves at the end of the branches: but according to Linnaeus purple, with the throat villose. It is a native of the Cape, flowering here in June.

The fifth has a shrubby stalk, seldom rising more than a foot high, dividing into many branches, which are slender, smooth, and spread out on every side: the leaves dark-green, having the appearance of those of the fir-tree, but narrower: the flowers are larger than those of the former, and the upper part of the petals is spread open flat: they are of a purple colour, and appear about the same time as the former. It is a native of the Cape.

Culture.—All the sorts may be increased by cuttings planted in a bed of loamy earth, during the summer months, and closely covered with a bell or hand glass to exclude the air, shading them from the sun, and refreshing them now and then with water. When well rooted they may be planted out, each into a small pot filled with loamy earth; placing them in the shade

till they have taken new root; then be removed into a sheltered situation, to remain till the beginning of autumn, when they must be placed in the green-house, and treated as the myrtles. They may likewise be increased by layers.

The second sort may also be raised by sowing the seeds in autumn, soon after they are ripe, in small pots filled with light earth, plunging them into an old bark-bed under a common frame in winter: the plants rise in the spring, and must be treated like the cuttings. The seedling plants grow the most erect, and make the handsomest appearance.

This sort is capable of living abroad in common winters, in a dry soil and warm situation; but in hard frosts the plants are frequently destroyed: one or two should therefore be kept in pots, and sheltered during that season.

They afford variety among other potted green-house plants.

PASSIFLORA, a genus containing plants of the herbaceous and shrubby flowering kinds.

It belongs to the class and order *Gynandria Pentandria*, (*Pentandria Trigynia*), (*Monadelphia Pentandria*), and ranks in the natural order of *Cucurbitaceæ*.

The characters are: that the calyx is a five-parted perianthium, flat, coloured: the corolla has five petals, semilanceolate, flat, blunt, of the same size and form with the calyx: nectary a triple crown; the outer longer, encircling the style within the petals, more contracted above: the stamens have five awl-shaped filaments, fastened to a column at the base of the germ, and united at bottom, spreading: anthers incumbent, oblong, blunt: the pistillum is a roundish germ, placed on the apex of a straight, cylindrical column: styles three, thicker above, spreading: stigmas capitate: the pericarpium is a fleshy berry, subovate, one-celled, pedicelled: the seeds very many, ovate, arilled: receptacle of the seeds triple, growing longitudinally to the rind of the pericarp.

The species cultivated are: 1. *P. cærulea*, Common or Blue Passion-flower; 2. *P. incarnata*, Rose-coloured Passion-flower; 3. *P. lutea*, Yellow Passion-flower; 4. *P. serratifolia*, Notch-leaved Passion-flower; 5. *P. maliformis*, Apple-fruited Passion-flower; 6. *P. quadrangularis*, Square-stalked Passion-flower; 7. *P. alata*, Wing-stalked Passion-flower; 8. *P. laurifolia*, Laurel-leaved Passion-flower, or Water Lemon; 9. *P. multiflora*, Many-flowered Passion-flower; 10. *P. rubra*, Red-fruited Passion-flower; 11. *P. Murucuja*, Moon-shaped-leaved Passion-flower; 12. *P. Vespertilio*, Bat-winged Passion-flower; 13. *P. rotundifolia*, Round-leaved Passion-flower; 14. *P. ciliata*, Ciliated

Passion-flower; 15. *P. suberosa*, Cork-barked Passion-flower; 16. *P. holosericea*, Silky-leaved Passion-flower; 17. *P. glauca*, Glauous-leaved Passion-flower; 18. *P. minima*, Dwarf Passion-flower.

The first rises in a few years to a great height, with proper support: it may be trained up more than forty feet high: the stalks will grow almost as large as a man's arm, and are covered with a purplish bark, but do not become very woody: the shoots often grow to the length of twelve or fifteen feet in one summer, and being very slender, must be supported, otherwise they will hang to the ground, intermix with each other, and appear very unsightly: at each joint is one leaf composed of five smooth entire lobes; the middle one, which is longest, almost four inches long, and one inch broad in the middle; the others are gradually shorter, and the two outer lobes are frequently divided on their outer side into two smaller ones: their foot-stalks are near two inches long, and have two embracing stipules at their base; and from the same point issues a long clasper or tendril: the flowers come out at the same joint with the leaves, on peduncles almost three inches long; they are blue, have a faint scent, and continue only one day: the fruit is egg-shaped, the size and shape of the Mogul-plum, and when ripe of the same yellow colour. It grows naturally in Brazil.

There is a variety with much narrower lobes, divided almost to the bottom: the flowers come later in the summer: the petals are narrower, and of a purer white colour.

The second species has a perennial root: the stalks are annual, slender, rising four or five feet high: at each joint one leaf, on a short foot-stalk, having mostly three oblong lobes, but the two side ones are sometimes divided part of their length into two narrow segments, and thus becoming five-lobed; they are thin, of a light green, and slightly serrate: the flowers are produced from the joints of the stalk, at the foot-stalks of the leaves, on long slender peduncles, in succession as the stalks advance in height during the summer months: they have an agreeable scent, but are of short duration, opening in the morning, and fading away in the evening: the fruit is as large as a middling apple, changing to a pale orange colour when ripe. It grows naturally in Virginia.

The third has a creeping root, sending up many weak stalks, three or four feet high: the leaves are shaped like those of ivy, and almost as large, but of a pale green and very thin consistence: the peduncle is slender, an inch and half long: the flowers dirty yellow, not larger than a sixpence when expanded. It is

a native of Virginia and Jamaica, flowering in May and June.

The fourth species is perennial and shrubby: the stems are round; the younger ones very slightly villose, and climbing very high: the stipules are linear and acuminate: the footstalks of the leaves furnished with two pairs of glandules: the leaves ovate, smooth, and slightly serrated round their whole outline: the peduncles are one-flowered and solitary: the flowers have an extremely agreeable odour. It is a native of the West Indies, flowering from May to October.

The fifth has a thick stem, triangular, by slender tendrils thrown out at every joint rising to the height of fifteen or twenty feet: at each joint is one leaf, six inches long, and four broad in the middle, of a lively green and thin texture, having a strong midrib, whence arise several small nerves, diverging to the sides, and curving up towards the top: petioles pretty long, having two small glands in the middle: two large stipules encompass the petioles, peduncles and tendrils at the base: the peduncles are pretty long, having also two small glands in the middle: the cover of the flower is composed of three soft velvety leaves, of a pale red, with some stripes of a lively red colour; the petals are white, and the rays blue: the flowers being large make a fine appearance, but are of short duration; there is however a succession for some time: the fruit is roundish, the size of a large apple, yellow when ripe, having a thicker rind than any of the other sorts. It grows naturally in the West Indies.

In the sixth the stem is almost simple, thick, membranaceous at the four corners, somewhat hispid: the leaves are petioled, five or six inches long, entire, somewhat rugged, but without any pubescence: the tendrils very long, axillary: stipules in pairs, ovate at the base of the petioles, on which are six glands: the peduncles opposite to the petioles, thicker: the flowers very large, encompassed by a three-leaved involucre, the leaves of which are roundish, concave, entire, smooth, pale: the fruit is very large, oblong, and fleshy: the flower is much larger, though very like the above sort in colour. It is a native of Jamaica.

The seventh species is very like the preceding at first sight: the open flower has also a general resemblance; but the peduncle is cylindrical; the three divisions of the involucre small, lanceolate, with glandular serratures; the pedicel thickest at the insertion into the convex base of the flower: the five or six outer petals are oblong with an awn, the inner longer; the outer principal rays thinnest and shortest; imperfect rays in a double row, below and distinct from them a single row: no imperfect opercu-

lum; operculum partly horizontal and partly turning up to the column, then folding back down again and embracing the column, with which it is so connected that it appears inseparable, but is not joined to the column: nectary round the column, confined by the base: the column comes to the bottom of it. It is a native of the West Indies.

If this does not equal the first sort in elegance, it exceeds it in magnificence, in brilliancy of colour, and in fragrance, the flowers being highly odoriferous.

The eighth has a suffrutescent stem, with very divaricating, filiform branches: the leaves a little emarginate at the base, nerved, and very smooth, on short petioles compressed a little, having two glands under the base of the leaf: the tendrils are very long: the peduncles the length of the petioles: the three leaflets of the involucre are roundish, concave, with blunt glandular toothlets about the edge, and pale: the five leaflets of the calyx are broad-lanceolate, slightly membranaceous at the edge, horned with a point or awn, smooth, variegated on the inside with blood-red dots: petals five, the length of the calyx, narrower, acuminate, with blood-red dots scattered over them: the flowers are very handsome and odoriferous, but the fruit ovate and watery. It flowers in June and July, and is a native of Jamaica.

The ninth species has slender stalks, sending out many small branches, and climbing to the height of twenty-five or thirty feet: by age they become woody towards the bottom, and their joints are not far asunder: the leaves are on short slender petioles, three inches and a half long, and two broad in the middle, rounded at the base, but terminating in a point at top, smooth, entire, and of a lively green colour: the flowers are axillary, on long peduncles, having an agreeable odour, but seldom continuing twenty hours open. There is a succession of them from June to September, and the fruit will sometimes ripen in this climate. It grows naturally at La Vera Cruz.

The tenth has an herbaceous stem, twining round, grooved, hirsute, red: the lobes of the leaves entire, nerved, somewhat hispid, soft: the petioles round, red, villose, without glands: the tendrils subaxillary: the flowers alternate, nodding, on solitary one-flowered peduncles: the fruit spherical, marked with six lines, scarlet when ripe, hirsute. It is a native of the West Indies, flowering in April and May.

The eleventh species has an herbaceous, grooved, smooth stem: the leaves ovate or oblong, two-horned, with an intermediate bristle, three-nerved, veined, smooth, entire: dots on the back hollowed, pellucid: the petioles grooved, smooth, destitute of glands: the tendrils sub-

axillary, filiform, long: the flowers in pairs, axillary, scarlet, large: the berry ovate, the size of a pigeon's egg, and pedicelled. It is a native of the West Indies.

The twelfth has slender, striated, roundish stalks, less than a straw, of the same thickness from top to bottom, and of a brownish red colour, dividing into many slender branches: the leaves shaped like the wings of a bat when extended, about seven inches in length, or rather breadth, from the base to the top not more than two inches and a half, the upper ones smaller, the middle wider, and the lower narrower, smooth and somewhat shining; the colour in the upper ones pale, in the middle deeper, in the lower darker green, with two purple tubercles or glands towards the base, where they are connected with the petiole; which is set half an inch from the base of the leaf, three nerves springing from it, two extending each way to the narrow points of the leaf, the other rising upright to the top, where is the greatest length of the leaf: the flowers are on short round peduncles from the axils of the middle and upper leaves, white and of a middle size, about three inches in diameter when expanded: they are without scent, open in the evening or during the night, in the month of July, and finally close about eight or nine o'clock in the morning. It is a native of the West Indies.

The thirteenth species has the stem suffrutescent at bottom, subdivided, angular, grooved: the leaves semiovate, three-nerved, veined, smooth on both sides, marked behind longitudinally with pellucid dots: lobes terminated by very small bristles; the middle one a little larger than the others: the petioles short, without glands: the tendrils filiform, very long: the stipules two, opposite, awl-shaped: the peduncles axillary, filiform, an inch long: the flowers nodding, pale green, rather large: the berry egg-shaped. It is distinguished from the other sorts by its rounded leaves slightly three-lobed at top only. It is a native of Jamaica.

The fourteenth runs to a great height, and has dark-green glossy leaves: the involucre is composed of three leaves divided into capillary segments, each terminating in a viscid globule: the pillar supporting the germen is bright purple with darker spots: the petals are greenish on the outside, and red within: the crown consists of four rows of radii, which are varied with white and purple. It is a native of Jamaica.

The fifteenth species rises with a weak stalk to the height of twenty feet: as the stalks grow old, they have a thick fungous bark like that of the Cork-tree, which cracks and splits: the smaller branches are covered with a smooth bark:

the leaves are smooth, on very short petioles: the middle lobe is much longer than the lateral ones, so that the whole leaf is halbert-shaped: the flowers are small, of a greenish yellow colour: the fruit egg-shaped, dark purple when ripe. It is perennial, and a native of the West Indies, flowering from June to September.

In the sixteenth species the stalks rise twenty feet high, dividing into many slender branches, covered with a soft hairy down: the leaves are shaped like the point of a halbert, three inches long, and an inch and half wide at the base, light green, soft and silky to the touch, standing obliquely to the foot-stalks: the flowers are not half so large as those of the common or blue Passion-flower: the fruit small, roundish, yellow when ripe, leaves ovate, tomentose on both sides: lateral lobes short; with an obsolete gland underneath behind the sinus of the lobe. It grows naturally at La Vera Cruz, flowering most part of the summer.

In the seventeenth, the whole plant is very smooth and even: the leaves glaucous underneath, undotted: the petioles furnished with two or four glands below the middle: the stipules acute, quite entire, more than half an inch in length: the flowers are sweet. It is a native of Cayenne.

The eighteenth species has the stem twining, simple, becoming corky at the base with age, round, smooth: the leaves subpeltate, subcordate: lateral lobes almost horizontal; all acute, nerved, smooth on both sides: the petioles short, round, reflex, smooth: the glands two, opposite, small, sessile, concave, brown, in the middle of the petioles: the stipules two, opposite, awl-shaped, by the side of the petioles: the tendrils long, between the petioles: peduncles axillary, solitary, longer than the petioles, loose, one-flowered: the flowers small, whitish: the berry small, blue, egg-shaped.

Culture.—In all the sorts it is either by seeds, layers, or cuttings, according to the kinds.

The first or hardy sort is capable of being raised either by seeds, layers, or cuttings: the seed should be sown in the early spring, as March, in large pots, half an inch deep, either plunging them in a warm border, and as the weather becomes warm moving them to the shade; or in a hot-bed, which will forward the germination of the seed more fully, and the plants will rise sooner; which should afterwards be hardened gradually to the open air till the autumn, and then placed under a garden-frame for the winter, to have shelter from frosts, and in the spring planted out in pots, or some in the nursery; and in a year or two they may be transplanted where they are to remain, against some warm south wall.

The layers should be laid down from some of the branches in the common way in the spring, when they will readily emit roots, and make proper plants by autumn; when, or rather in spring following, they should be taken off and transplanted either into pots in nursery rows, or where they are to remain.

The cuttings should be made in February or March from the strong young shoots, in length from about eight to ten or twelve inches, planting them in any bed or border of common earth, giving frequent watering in dry weather, and when sunny and hot, if in a situation exposed to them, a moderate shade of mats will be of much advantage. They will emit roots at bottom, and shoots at top, and become good plants by autumn, allowing them the occasional shelter of mats, &c. during the winter's frost; and in the spring let them be planted out. If a quantity of these cuttings be planted close, and covered down with hand-glasses, it will forward their rooting; observing, however, when they begin to shoot at top, to remove the glasses, in order to admit fresh air.

The second and third, or green-house kinds, may be increased by seed, layers, and parting the roots: the seed, obtained from America, should be sown in pots in March or April, plunging them in a hot-bed to raise the plants, which afterwards inure to the open air in summer, giving them the shelter of a green-house or frame in winter; and in the spring following plant some out in pots, placing them among the green-house plants; and others may be planted in the full ground, under a warm fence, to take their chance.

The layers should be made in the summer from young shoots, which will readily grow, and become good plants for potting off in autumn. The parting the roots should be done in spring, before they begin to shoot. The second sort multiplies exceedingly by its creeping roots; which should be divided into slips, and planted in a bed of rich earth till autumn, when some should be transplanted into pots for occasional shelter in winter.

All the other more tender stove kinds are capable of being increased by seeds, layers, and cuttings: The seeds are procured chiefly from abroad; and should be sown in spring in pots, plunging them in a hot-bed, or in a stove bark-bed: the plants soon appear, which, when three inches high, should be pricked out in separate small pots, giving water, and re-plunging them in the hot-bed, occasionally shading them till rooted: as they advance in growth, they should be shifted into larger pots, and be retained constantly in the stove.

The layers should be made from the young branches in the spring or beginning of summer, which will readily grow, and be fit to pot off separately in autumn.

The cuttings should be made in the spring or summer, from the young shoots, planting them in pots, plunging them in the bark-bed, and giving water frequently; when most of them will take root, and be fit to pot off singly in autumn.

In respect to their general culture; as in severe winters, in the first sort, the branches, if not duly protected, are sometimes killed, it is advisable at such times, whilst the plants are young in particular, to give them the shelter of mats during the inclement season, and protect their roots with dry litter laid over the ground; carefully uncovering their branches as soon as the frost breaks: this covering, however, is only necessary in very severe frosts.

The green-house sorts should generally be potted, to move to shelter in winter, either of a green-house, or deep garden-frame: some plants of each sort may also be planted in the full ground, in a warm border, to take their chance; covering the ground over their roots in severe weather; and in the different orders of planting, placing stakes for the support of their climbing growth in the summer. And all the stove kinds must constantly be kept in pots, placed in the stove, and for the most part plunged in the bark-bed; placing strong stakes for the purpose of training the branches to, and managing them as other stove-plants of a similar growth. See STOVE-PLANTS.

The first sort is highly ornamental in the open ground when trained against southern walls, &c.; and those of the green-house, and stove kinds, among other plants in these collections.

PASTINACA, a genus containing plants of the herbaceous esculent kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferae*.

The characters are: that the calyx is an universal umbel, manifold, flat: partial manifold: involucre universal none: partial none: perianthium proper obsolete: the corolla universal uniform: florets all fertile: proper of five lanceolate involute entire petals: the stamina have five capillary filaments: anthers roundish: the pistillum is an inferior germ: styles two, reflex: stigmas blunt: there is no pericarpium: fruit compressed flat, elliptic, bipartite: the seeds two, elliptic, girt round the edge, almost flat on both sides.

The species cultivated are: 1. *P. sativa*, Common Parsnep; 2. *P. Opopanax*, Rough Parsnep.

In the first, in the wild plant, the root is biennial, simple, whitish, putting forth some large fibres from the side: the stem single, three or four feet high, erect, rigid, angular, pubescent, hollow, branched: the leaves alternate, smaller than those of the cultivated kind, and of a darker green; in open situations pubescent, especially the root-leaves: the flowering-branches come out from the axils of the leaves from top to bottom, supporting umbels which are smaller than that which terminates the stem: the flowers small, yellow, with inflex regular petals.

It is a native of most parts of Europe; but the garden or cultivated variety has smooth leaves, of a light or yellowish green colour, in which it differs from the wild plant: the stalks also rise higher, and are deeper channelled: the peduncles are much longer, and the flowers of a deeper yellow colour: the roots are sweeter than those of carrots, and are much eaten by those who abstain from animal food in Lent, or eat salt-fish; and are highly nutritious. Hogs are fond of these roots, and cattle will eat them.

The second species has a perennial root, as thick as the human arm, yellow, branched: the branches an inch or an inch and half in thickness, a foot and half in length, tubercled, with a corky bark: the stem from three feet to the height of a man, the thickness of a finger, striated, covered at the base with scarioso membranaceous scales, like the ferns; in other parts very smooth and shining; angular at top, especially at the branches. Primary (or root) leaves quite simple, cordate, acutely crenate: the others ternate or quinate, with the end leaflet always cordate and very large; the lateral ones obliquely cordate, with the upper lobe shorter: the lowest stem-leaves more compound, considered as a whole triangular, two feet long, bipinnate, having five pinnules on each side; the lowest pinna pinnate, commonly with five leaflets, the end one cordate, the rest sessile and obliquely cordate: the leaflets are an inch to two inches long; the other pinnules are first ternate, then simple. The other stem-leaves decrease, and are first quinate, next ternate, and at the branches simple. Petiole of the root-leaves from the sheath to the first pinna flattish above and thence angular-keeled; on the contrary, that of the branch-leaves is furrowed. Sheaths wide striated, in the root-leaves very strigose: in the stem-leaves smooth. All the leaflets are hairy, especially at the back. At the flowering-branches there are spathaceous sheaths, which are naked, or destitute of leaves. The umbelliferous branches are very smooth; first alternate, erect, then two, three, or four

together in a sort of whorl, two or three inches long, with one or two spathaceous leaflets towards the middle, or at the top. The universal umbels have usually seven or eight rays, an inch long, of a yellowish green colour: the fruits flat, with the rim thicker, three or four lines in diameter, and a little longer: the juice is yellow, bearing no marks of a resinous or aromatic principle. It flows out where either the leaf or stalk is broken. They are both very rough; the former dark green, the latter seven or eight feet high: the stalks divide towards the top into many horizontal branches, each terminated by a large umbel of yellow flowers; which appear in July. It is a native of the south of Europe.

It commonly ripens its seeds in this climate, and its juice manifests some of the qualities discovered in the officinal *Opopanax*: but it is only in the warmer regions of the East, where this plant is also a native, that the juice concretes into this gum-resin. It is obtained by means of incisions made at the bottom of the stalk.

Culture.—In the first sort it is easily effected by sowing fresh seed in the latter end of February, or beginning of the following month, upon a bed prepared in a spot of the best light, rich, deep soil, in one of the most open airy quarters of the garden, by being trenched one full spade deep at least, or if two the better, provided the depth of good staple admit, that the roots may have a due depth of loose soil to run down straight to their full length. And if the ground be previously trenched up in rough ridges in winter, especially where stiff or wet, and lie exposed some time to the sun and air, it will be much improved for this purpose. At the time of sowing, the ground should be made level and even on the surface, but not raked till after the seed is sown, which should be performed while the ground is fresh stirred, or before the surface becomes too dry, so as, in raking, the clods will readily fall under the rake to bury the seed regularly.

The seed should be sown broad-cast thinly, either all over the surface, or the ground may be divided into four-feet-wide beds, as most convenient, but for large quantities the former is the most eligible practice. As soon as the sowing is done, if light ground, it is the practice with some to tread down the seeds evenly, and finish with an even good raking, to cover all the seeds equally, smoothing the surface. In about three weeks the seeds begin to germinate, and the plants soon appear above ground. When they are two or three inches high, they should be thinned to regular distances, and cleaned

from weeds; which may be done either by hand or small-hoeing; but the latter is preferable for the benefit of the crop, and considerably the most expeditious: it should generally be performed by a three- or four-inch hoe. Dry weather should be chosen for the purpose, and the plants cut out to about ten or twelve inches distance, as they should have large room, cutting up all weeds as the work proceeds. After this, no more culture is required till the future progress of the weeds renders another hoeing necessary; and probably another repetition may also be required, till the plants are in full leaf, when they cover the ground, and bid defiance to any further interruption from weeds.

In the autumn, about October, the roots will be arrived nearly at their full growth; when the leaves begin to turn yellow and decay, which is a certain sign of their maturity: they may then be dug up for use, as they are wanted.

These roots may either remain in the ground all winter, and be taken up as wanted, or a quantity may be dug up in autumn, and their tops pared off close, and then buried all winter in sand, in a shed or other dry place, to be ready at all times for use: some should also be left in the ground for spring service, as January or the beginning of February, digging them up just before they begin to shoot, and laying them in the sand; as by taking them up at this time, it retards their effort for shooting, so as that they continue in tolerable perfection until the latter end of April or longer.

In order to have parsneps in due perfection, great care is necessary to save seed only from some of the finest rooted plants; for which purpose, a quantity of the large, long, straight roots should be selected, trimming off their leaves, and planting them in rows three feet asunder, and two distant in the lines, about an inch deep over their top; in which method they will shoot up strong in spring for flowering, and ripen seed in the latter end of August, or early in September; when in a dry day, the umbels of seed should be cut off and spread upon mats to dry and harden, afterwards thrashing out the seeds, and putting them up in bags for use.

The second sort may be raised, by sowing the seed in the places where the plants are to remain, at the same season as the above; keeping the plants afterwards properly thinned and clear from weeds.

The first is an useful esculent root, that contains a large proportion of nutritious matter; but the latter is chiefly cultivated for affording variety in the borders or other parts of pleasure-grounds.

PEA. See *Pisum*.

PEA, EVERLASTING. See *LATHYRUS*.

PEA, HEART. See *CARDIOSPERMUM*.

PEA, PIGEON. See *CYTISUS*.

PEA, SWEET. See *LATHYRUS*.

PEA, WING. See *LOTUS*.

PEACH TREE. See *AMYGDALUS*.

PEAR TREE. See *PYRUS*.

PELARGONIUM, a genus containing plants of the fine shrubby under shrubby evergreen and herbaceous perennial kinds for the greenhouse.

It belongs to the class and order *Monadelphia Heptandria*, and ranks in the natural order of *Germinales*.

The characters are: that the calyx is a one-leaved perianthium, five-parted: segments ovate, acute, concave, permanent, upper segment ending in a capillary nectariferous tube, decurrent along the peduncle: the corolla has five petals, obcordate or ovate, spreading, large, irregular: the stamina have ten awl-shaped filaments, united at the base, spreading at top, unequal in length, all shorter than the corolla, three of them (seldom five) castrated: anthers seven, oblong, versatile: the pistillum is a five-cornered germ, beaked: style awl-shaped, longer than the stamens, permanent: stigmas five, reflex: the pericarpium is a five-grained capsule, beaked, the cells opening inwards: the beak spiral, bearded on the inside: the seeds solitary, ovate-oblong.

The species cultivated are: 1. *P. alchemilloides*, Lady's-mantle-leaved Crane's-bill; 2. *P. odoratissimum*, Sweet-scented Crane's-bill; 3. *P. grossularioides*, Gooseberry-leaved Crane's-bill; 4. *P. coriandrifolium*, Coriander-leaved Crane's-bill; 5. *P. carnosum*, Fleishy-stalked Crane's-bill; 6. *P. ceratophyllum*, Horn-leaved Crane's-bill; 7. *P. gibbosum*, Gouty Crane's-bill; 8. *P. radula*, Multifid-leaved Crane's-bill; 9. *P. papilionaceum*, Butterfly Crane's-bill; 10. *P. inquinans*, Scarlet-flowered Crane's-bill; 11. *P. zonale*, Common Horse-shoe Crane's-bill; 12. *P. bicolor*, Two-coloured Crane's-bill; 13. *P. vitifolium*, Balm-scented Crane's-bill; 14. *P. capitatum*, Rose-scented Crane's-bill; 15. *P. glutinosum*, Clammy Crane's-bill; 16. *P. cucullatum*, Hooded Crane's-bill; 17. *P. cordatum*, Heart-leaved Crane's-bill; 18. *P. echinatum*, Prickly-stalked Crane's-bill; 19. *P. tetragonum*, Square-stalked Crane's-bill; 20. *P. betulinum*, Birch-leaved Crane's-bill; 21. *P. glaucum*, Spear-leaved Crane's-bill; 22. *P. acetosum*, Sorrel Crane's-bill; 23. *P. scabrum*, Rough-leaved Crane's-bill; 24. *P. ternatum*, Ternate Crane's-bill; 25. *P. tricolor*, Three-coloured Crane's-bill.

The first sends out several herbaceous stalks about a foot and half in length. The flowers are

pale blush-colour, several together upon very long peduncles: and there is a succession of them during all the summer months.

There is a variety with a dark circle in the middle of the leaves.

The second species has a very short fleshy stalk, dividing near the ground into several heads, each having many leaves, on separate footstalks from the heads; they are soft and downy, and have a strong scent like aniseed. From these heads come out several slender stalks, near a foot in length, prostrate, with rounder leaves than those near the root, but of the same texture and odour: the flowers are produced from the side of these stalks, three, four, or five standing together upon slender peduncles; they are white, but being small they make little appearance.

The third has the stem prostrate, four-cornered, smooth; as is also the whole plant, which is biennial, sending out a great number of very slender trailing stalks, extending a foot and half in length: the leaves are small, marked with lines: the peduncles are capillary, with two or three small flowers, of a pale flesh-colour. They continue in succession all the summer.

The fourth species is an annual or rather biennial plant, with branching stalks near a foot high: the lower leaves stand upon long footstalks, but those on the upper part sit close to the stalks: the flowers stand upon naked peduncles, which proceed from the side of the stalks, on the side opposite to the leaves: they grow three or four together upon short separate pedicels: they are of a pale flesh-colour, and appear in July.

The fifth has a thick fleshy knotted stalk, rising about two feet high, sending out a few slender fleshy branches, thinly set with leaves, which on the lower part of the stalk are petioled, but above sessile: the flowers are produced in small clusters at the ends of the branches: the petals are narrow and white, making no great appearance; they continue in succession most part of the summer.

The sixth species flowers in May, and continues to do so during most of the summer months: the seeds ripen in this climate. It is a native of the South-west coast of Africa.

The seventh has a round fleshy stalk with swelling knots at the joints, rising about three feet high, and sending out several irregular smooth branches: the leaves are thinly disposed, smooth, fleshy, gray, ending obtusely, and standing on short footstalks: the flowers four or five on a peduncle: the petals dark-purple, having a very agreeable scent in the evening: it flowers most part of the summer.

The eighth species has a shrubby stem, covered with an ash-coloured bark, branched, two feet high: the leaves are numerous, alternate, nearly equal to the petioles, very deeply five-cleft: the segments pinnate and bipinnate, linear: stipules wide, acuminate and shrivelling: the peduncles axillary, solitary, with one, two, or three flowers: involucre generally five-cleft, shrivelling. The whole plant has a strong smell of turpentine. The leaves in the young plants are often three inches long; but in old ones only one third of the size, and more numerous. It has the name *Radula*, from the rough rasp-like surface of its leaves. It flowers from March to July.

There are two varieties, a larger and a smaller: and as it is readily raised from seeds, it affords many seminal varieties.

The ninth rises with an upright shrubby stalk seven or eight feet high, sending out several side branches with large, angular, rough leaves, on short footstalks: the flowers are produced in large panicles (umbels) at the ends of the branches: the two upper petals, which are pretty large, turn upwards, and are finely variegated; but the three under ones are very small, and, being bent back, are screened from sight, unless the flower be viewed near. It flowers from April to July.

The tenth species rises with a soft shrubby stem to the height of eight or ten feet, sending out several branches, which are generally erect: the leaves of a thick substance, and a lucid green, on pretty long footstalks, covered with soft hairs on their under side: the flowers are in loose bunches (umbels), on long, stiff, axillary peduncles: the corolla bright scarlet: the flowers make a fine appearance, and there is a succession of them during all the summer months.

The eleventh rises with a shrubby stalk four or five feet high, and divides into a great number of irregular branches, so as to form a large bush, frequently eight or ten feet in height: the leaves are indented on the edge in several obtuse segments, cut into short teeth; there is a purplish curved zone in form of a horse-shoe, from one side of the base to the other, corresponding with the border; and when gently rubbed, the leaves have a scent like scalded apples: the flowers are produced in pretty close bunches, on axillary peduncles, five or six inches in length, coming out towards the ends of the branches; they are of a reddish purple colour, and continue in succession great part of the summer.

There is a variety with fine variegated leaves, and the flowers vary much in colour from

purple, through the different shades of red to high scarlet.

The twelfth species has the stem shrubby, twisted, covered with an ash-coloured bark: the branches round, villose, sub-herbaceous, a foot long: the leaves opposite, on long petioles, glaucous, rugged; lobes curled, toothed: the stipules almost embracing, acuminate: the common peduncle often opposite to a leaf, or lateral, sometimes axillary, longer than the leaf: involucre one-leaved, many-parted, shrivelling; rays about thirteen, scarcely an inch long. It is remarked by Jacquin, that the whole has a very strong smell: and Curtis says that it obviously differs from all the other species in the particular shape of its leaves, and the colour of the flowers, which are usually of a rich and very dark purple edged with white. It flowers from June to August.

The thirteenth species rises with an upright shrubby stalk to the height of seven or eight feet, sending out many pretty strong branches: the leaves are somewhat like those of the vine; the lower on long petioles, the upper on short ones; when rubbed, they have a scent of balm: the flowers grow in compact clusters, on the top of long, naked, axillary peduncles, rising much higher than the branches; being small and of a pale blue colour, making no great figure; but containing a succession for most part of the summer.

The fourteenth rises with a shrubby stalk four or five feet high, dividing into several weak irregular branches: the leaves are divided into three unequal lobes, which are hairy, and waved on their edges; they are placed alternately, and their footstalks are hairy: the flowers grow in close roundish heads, forming a sort of corymb; are of a purplish blue colour, and continue in succession a great part of the summer: the leaves, when rubbed, have the odour of dried roses.

The fifteenth species has a shrubby stem, covered with a gray bark, three feet high and more; branches declining and decumbent, green, clammy, as is the whole plant: the leaves are alternate, the uppermost sometimes opposite, often shorter than the petioles, large, acute, sinuate: the stipules wide-acuminate, shrivelling: the common peduncles axillary, lateral, or opposite to a leaf, erect, solitary, longer than the leaves: involucre five-leaved, the leaflets ovate-acute, shrivelling: rays from three to eight, half an inch long: the middle of the leaf is generally stained with purple. It flowers in May and June, continuing to September.

Several varieties have been produced from seed.

The sixteenth rises with a shrubby stalk eight or ten feet high, sending out several irregular branches: the leaves are roundish, with the sides erect, so as to form a hollow or hood, whence termed cowlid; are heart-shaped at the base, or kidney-shaped, and from the footstalk run many nerves arising from a point, but diverging towards the sides; the borders are sharply indented; those on the lower part of the branches have long footstalks, and are placed without order on every side, but those on the upper part have shorter footstalks, and stand opposite: the flowers are produced in large panicles (or umbels) on the tops of the branches, of a purple blue colour. It flowers from June to September.

The seventeenth species has a shrubby branched stem, when young red, when very young green and villose, when old covered with an ash-coloured bark: the leaves are alternate, almost equal to the petioles, tomentose, whitish underneath: the stipules subovate: the flowers at the ends of the stem and branches in numerous umbels. It flowers from March to July.

There are several varieties.

The eighteenth has the stalk green, surface smooth and somewhat glossy, beset with spines which bend back and terminate in brownish weakish points; these appear to have been primarily the stipules, which become thus fleshy and rigid: the leaves are on long footstalks, veiny, soft and downy, especially on the under side, which is of a much lighter colour than the upper: the flowering stem proceeds from the summit of the stalk, and is a foot or more in height: as it advances it throws out its branches or peduncles, ultimately about five in number, each of which has a leaf at its base, similar to the other leaves of the plant, but smaller, and terminates in an umbel of seven or eight flowers of a spotted purple colour. In its habit it somewhat resembles the preceding. It flowers from May to September.

It varies with petals of a rich purple colour, in which the spots are similar, but not so conspicuous.

The nineteenth species has angular stems, angles four, sometimes three, succulent, as is the whole plant, procumbent when they shoot out into length, at first hairy, afterwards very smooth, much branched, and three feet high: the leaves alternate, almost equal to the petioles, orbiculate, five-lobed; the younger villose, tooth-crenate, violate-coloured underneath, and above having a dark red zone; the older crenate, fleshy, dark green, with a few villose hairs, and frequently with a zone: the stipules short, semicircular, spreading, shrivelling: the pe-

duncles axillary, erect, rugged; with four subovate stipules at the forks. Mr. Curtis observes that a vein of singularity runs through the whole of this plant: its stalks are unequally and obtusely quadrangular, sometimes more evidently triangular: its leaves few and remarkably small: its flowers, on the contrary, are uncommonly large, and, what is more extraordinary, have only four petals; previous to their expansion the body of filaments is bent so as to form a kind of bow.

There is a variety with beautifully coloured leaves.

The twentieth has a shrubby stem, four or five feet high, sending out several branches: the peduncles long, coming out from the side of the branches: the flowers vary considerably both in size and colour: its foliage is different from that of the other sorts, and, as its name imports, like that of the birch-tree. It flowers most part of the summer.

In the twenty-first, the whole plant is very smooth, glaucous, and in a manner whitish: the stem shrubby, with round, rod-like, declining branches, two feet high: the leaves opposite, often shorter than the petioles, which are round and erect: the stipules lanceolate-acuminate, fleshy, deciduous: the peduncles alternately axillary, very long, one- or two-flowered. It flowers from June to August.

The twenty-second species has a shrubby stem, six or seven feet high, sending out several side branches: the leaves of a gray colour, and having an acid taste like sorrel: the peduncles axillary, long, sustaining three or four flowers, with narrow unequal petals, of a pale blush-colour, with some stripes of a light red: the flowers continue in succession most part of the summer.

There is a variety with scarlet flowers raised from seed.

The twenty-third has a shrubby stem, round, three or four feet high, the thickness of a finger, upright, of a reddish bay colour, branching from the axils, very rough, as is the whole plant, but becoming smooth with age: the leaves on long petioles, very widely wedge-shaped, three-nerved, acute, stiffish, alternate, except the upper ones next the flowers, which are opposite, the lower ones seven or eight inches in length reckoning the petioles; the lobes gashed or thinly toothed, but sometimes quite entire: the stipules small, ovate-acuminate, on each side next the petioles: the common peduncles terminating and axillary, short, sustaining commonly from four to six flowers, of a purple rose-colour, with dark blood-red spots. It flowers from August to November.

The twenty-fourth has a suffrutescent stem,

dichotomous, round, purple, villose, erect, two feet high and more: branches simple, short, resembling the stem: the leaves rigid, strigose-rugged, an inch long: serratures purplish: the petioles villose, the length of the leaves: the stipules two or more, ovate-acute, concave, a line in length: the flowers lateral and terminating, unlobed: involucres lanceolate, purple, subciliate. It differs materially from the other sorts in the unusual roughness of the stalks, as well as in its whole habit.

The twenty-fifth species, which is but newly introduced, scarcely exceeds a foot in height, growing up with a shrubby stem, and spreading widely into numerous flowering branches, so much disposed to produce flowers in a constant succession, that during most of the summer the plant is loaded with a profusion of them. For the most part they go off without seed; and when any is produced, there is generally one perfect and four abortive. The whole plant is covered with short white hairs, which give to the foliage a somewhat silvery hue. The two uppermost petals are of a beautiful red, having their bases nearly black; the three lowermost are white.

Most of the above species are natives of the Cape.

There are also many other species that may be cultivated.

Culture.—All the sorts may be increased by seeds, which should be sown in the early spring in pots filled with kitchen garden mould, plunging them in a moderate hot-bed. The plants soon appear; when they should have fresh air as much as possible, to prevent their being drawn up weak. When the plants have attained some growth, they should be removed into separate small pots filled with the same sort of earth, replunging them in the hot-bed till fresh rooted, and giving proper shade. They should afterwards be gradually inured to the open air, in order to be placed out in it in the summer season in a sheltered situation.

They may also be raised in the open ground, without the hot-bed, but not so well.

But they are more commonly increased, especially the shrubby sorts, by cuttings of the young branches, which should be planted in a shady border in the summer, or in pots, and plunged in any hot-bed; which is the better method. When well rooted they may be taken up, and planted into separate pots, placing them in the shade if they have taken new root; after which they may be removed into a sheltered situation, and be treated in the same manner as the seedling plants. The fifth, seventh, and fifteenth sorts have more succulent stalks than the others: the

cuttings should therefore be planted in pots filled with the same sort of earth, and plunged into a very moderate hot-bed, where they may be shaded from the sun in the heat of the day, and have but little water; for these are very apt to rot with much moisture. When these are well rooted, they may be removed, and planted in separate pots filled with the same sort of earth, and placed in the shade till they have taken new root; then they may be removed into a sheltered situation, where they may remain till autumn. These sorts should be sparingly watered, especially in the winter season, as they are apt to take a mouldiness with moisture, or in a damp air. They thrive much better in an airy glass-case than in a green-house, as in the former they have more sun and air than in the latter. But all the other shrubby sorts are proper for the green-house, where they only require protection from frost, but should have a large share of free air when the weather is mild. They require water every week, in mild weather once or twice; but it should not be given them in too great plenty, especially in frosty weather. These plants should be hardened in the spring gradually, and towards the middle or end of May be taken out of the green-house, and at first placed under the shelter of trees, where they may remain a fortnight or three weeks to harden; and then be removed into a situation where they may be defended from strong winds, and enjoy the morning sun till eleven o'clock, where they will thrive better than in a warmer situation. And as these sorts grow pretty fast, they soon fill the pots with their roots; and when they stand long unremoved in summer, they frequently put out their roots through the holes at the bottom of the pots into the ground, when the plants grow vigorously; but if suffered to continue long in this manner, it is difficult to remove them; as, if their roots be torn off, all the younger branches decay, and the plants are frequently killed. The pots should therefore be moved once in a fortnight or three weeks, in the summer months, and the roots which may be then pushing through the holes cut off, to prevent their striking into the ground.

They require also to be new potted at least twice in the summer; the first time after they have been three weeks or a month out of the green-house; the second towards the end of August, or the beginning of September, that the plants may have time to establish their new roots before they are removed into the green-house. When this is performed, all the roots on the outside of the balls of earth should be carefully pared off, and as much of the old earth drawn away from the roots, as can be done with safety

to the plants; then, where they require it, they should be put into pots a size larger than those out of which they were taken, putting a quantity of fresh earth into the bottom of each pot, placing the plants upon it, being careful that the ball about the roots of the plant be not so high as the rim of the pot, that some room may be left to contain the water which may be given to them. Then the cavity all round the ball should be filled up with fresh earth, be gently pressed down, and the bottom of the pot beaten upon the ground, to settle the earth; the plant being then well watered, and the stem fastened so as to prevent the wind from displacing the roots before they are fixed in the new earth.

Where such mould as has been mentioned cannot be procured, fresh hazel loam from a pasture, mixed with a fourth or a fifth part of rotten dung; or, where the earth is inclinable to bind, a mixture of rotten tan; and, where light and warm, a mixture of neat's-dung may be employed. This compost should be mixed three or four months before it is used, and be turned over three or four times, that the parts may be well incorporated.

The shrubby sorts require to be looked over frequently during the winter, while they are in the green-house, to pick off all decayed leaves from them, which if left on will not only render the plants unsightly, but by their falling off make a litter among the other plants; and if they are suffered to rot in the house, they occasion a foul, nasty, damp air, which is very prejudicial to all the plants.

The first sort from having herbaceous stalks is best increased by seeds, though cuttings of it will take root.

And the second sort may not only be propagated by seeds, but also from heads slipped off from the short fleshy stalk; which should have their lower leaves stripped off, and be then planted single in a small pot; or where the heads are small, two or three may be put into one pot; plunging them into a very moderate hot-bed, shading and refreshing them gently with water. They take root in a month or five weeks; when they should be hardened gradually to the open air, where they may remain till autumn, when they must be removed into shelter, as in the other kinds.

The sixth kind is capable of being increased both by seeds and cuttings, but is found to be more tender than many other sorts, and more liable to be injured by damps. The eighth species is readily increased by cuttings; but the twelfth is more difficultly raised in this way. The fifteenth is easily raised by cuttings, and

sometimes by seeds: and the seventeenth readily strikes from cuttings: the eighteenth produces seeds, but is more usually increased by cuttings: and the nineteenth and twentieth are readily propagated in the same way: the twenty-first is likewise raised from cuttings, but they are not very free in striking: the twenty-fourth is raised in this manner without difficulty: but in the twenty-fifth, from the branches running out speedily into flowering stalks, few are formed proper for cuttings, and these are struck with difficulty.

All these plants are highly ornamental, and afford considerable variety in collections of green-house plants.

PELLITORY, BASTARD. See *ACHILLEAS*.

PELLITORY OF SPAIN. See *ANTHEMIS*.

PENNY-ROYAL. See *MENTHA PULEGIUM*.

PENTAPETES, a genus comprising a plant of the exotic kind, for the stove.

It belongs to the class and order *Monadelphia Dodecandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a double perianthium: outer three-leaved, one-sided, caducous: leaflets linear, acuminate: inner one-leaved, five-parted, permanent: segments lanceolate, acuminate, spreading, longer than the corolla: the corolla has five petals, roundish, spreading, fastened to the pitcher of stamens: the stamina have fifteen filaments, filiform, upright, shorter than the corolla, united below into a pentagon pitcher, but free above: anthers sagittate, upright: ligules five, linear-lanceolate, petal-shaped, upright, each between every three stamens, springing from the pitcher: the pistillum has an ovate germ: style filiform, thickened above, striated, longer than the stamens, permanent: stigma obsoletely five-toothed: the pericarpium is a membranaceous capsule, subglobular, acuminate, five-celled, five-valved: partitions contrary: the seeds eight, ovate, acute, four on each side, fastened within side to the partition.

The species is *P. Phœnicea*, Scarlet-flowered Pentapetes.

It is an annual plant, which dies in the autumn soon after it has ripened seeds: it has an upright stalk from two to near three feet high, sending out side branches the whole length: those from the lower part of the stalks are the longest: the others gradually diminish, so as to form part of a pyramid. They are garnished with leaves of different forms: the lower leaves, which are largest, are cut on their sides towards the base into two side lobes which are short, and the middle is extended two or three inches

further in length, so that the leaves greatly resemble the points of halberts in their shape; they are slightly serrate, and of a lucid green on their upper side, but paler on their under, standing upon pretty long footstalks: the leaves which are on the upper part of the branches are much narrower, and some of them have very small indentures on their sides; they sit closer to the stalks, and are placed alternately: the flowers are axillary; they come out for the most part singly, but sometimes there are two arising at the same place from the side of the footstalk of the leaves: the peduncle is short and slender; they are of a fine scarlet colour, appearing in July. It is a native of India.

Culture.—This plant may be increased by sowing the seeds upon a good hot-bed early in March; and when the plants are fit to remove there should be a new hot-bed prepared to receive them, into which must be plunged some small pots filled with good kitchen-garden earth; into each of which one plant should be put, giving them a little water to settle the earth to their roots, shading them from the sun till they have taken new root; when they should be treated in the same way as other tender exotic plants, admitting the free air to them every day in proportion to the warmth of the season, and covering the glasses with mats every evening. When the plants are advanced in their growth so as to fill the pots with their roots, they should be shifted into larger pots, filled with the same sort of earth as before, and plunged into another hot-bed, where they may remain as long as they can stand under the glasses of the bed without being injured; and afterwards they must be removed either into a stove or a glass-case, where they may be screened from the cold, and in warm weather have plenty of fresh air admitted to them.

These plants are sometimes turned out of the pots, when they are strong, and planted in warm borders; where, if the season prove very warm, the plants will flower tolerably.

PENTSTEMON, a genus containing plants of the hardy herbaceous flowering kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a one-leaved perianthium, five-parted, permanent: segments lanceolate, almost equal: the corolla one-petalled, two-lipped: tube longer than the calyx, gibbous above at the base, wider at top, and there ventricose underneath: upper lip upright bifid; segments ovate, blunt, shorter than the lower lip: lower lip three-parted; segments ovate, blunt, bent down, shorter than the tube:

the stamina have four filiform filaments, diverging at the tip, inserted into the base of the tube, and shorter than it; the two lower longer: anthers roundish, distant, included, bifid; with the lobes divaricating: the rudiment of a fifth filament between the upper ones inserted into the tube, the same length with the stamens, filiform, straight, bearded above at the tip: the pistillum is an ovate germ: style filiform, the length of the tube, bent down at the tip: stigma truncate: the pericarpium is an ovate capsule, acute, compressed, two-celled, two-valved; the seeds numerous, subglobular: the receptacle large.

The species cultivated is *P. levigata*, Smooth Pentstemon.

It has a perennial, creeping, fibrous, white root: the stem a foot and half high and more, round, purple below, brachiate: the lower leaves ovate-acuminate, quite entire, petioled, sometimes purple underneath, on petioles winged to the base: the stem-leaves ovate-lanceolate, opposite, embracing, toothfretted, smooth on both sides: the flowering branches in a manner dichotomous, with the flowers two together: the corolla pale purple, somewhat hirsute on the outside.

Culture.—This plant may be increased by sowing the seeds either in the autumn or early spring in the places where they are to remain, or in beds, to be removed in the beginning of the summer to the borders or clumps of the pleasure-grounds.

They afford variety among other plants of similar growth in these situations.

PEPPER. See PIPER.

PEPPER, GUINEA. See CAPSICUM.

PEPPER, JAMAICA. See MYRTUS.

PEPPERMINT. See MENTHA.

PERENNIAL PLANTS, are such as are of long duration. Such plants as are perpetuated by the roots, whether the leaves and stalks decay annually in winter, or always remain, provided the roots are of many years duration, are perennial. All plants, therefore, with abiding roots, both of the herbaceous, shrub, and tree kinds, are perennials; though in the general acceptance of the word perennial, it is most commonly applied to herbaceous vegetables with durable roots, more especially those of the flowery kind, which among gardeners are commonly called simply perennials, particularly the fibrous-rooted tribe: but it is equally applicable to fibrous, tuberous, and bulbous-rooted plants, whose roots are of several years' duration: likewise all shrubs and trees of every denomination, as having abiding roots, are perennial plants.

And these sorts of plants consist both of deciduous and ever-green kinds; those that cast

their leaves, &c. in winter being termed deciduous perennials, and those which retain their leaves, ever-greens.

The herbaceous perennials, of the fibrous, tuberous, and bulbous-rooted kinds, for the greater part have annual stalks, rising in spring and decaying in winter; and a great many lose their leaves entirely also in that season, such as the perennial sun-flower, asters, and numerous other sorts; and many retain their leaves all the year, but not their stalks; as is exemplified in the auricula, polyanthus, some campanulas, pinks, carnations, and many other plants.

Numbers of the herbaceous perennials multiply exceedingly by off-sets of the root, by which they are readily propagated. See OFF-SET, &c.

All the tree and shrub perennials are durable in root, stem, and branch; but renew their leaves annually. Even the ever-green kinds, although they are in leaf the year round, put forth new leaves every year, to which the old ones gradually give place. See DECIDUOUS and EVER-GREEN TREES, &c.

PERILOCA, a genus comprising plants of the woody climbing kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-cleft perianthium, very small, segments ovate; permanent: the corolla one-petalled, wheel-shaped, five-parted: segments oblong, linear, truncated, emarginate: nectary very small, five-cleft, surrounding the genitals, putting out five threads, curved inwards, shorter than the corolla, and alternate with it: the stamina have short filaments, curved inwards, converging, villose: anthers twin, acuminate, converging over the stigma; with lateral cells: pollen bags five, at the notches of the stigma, each common to two anthers: the pistillum consists of two ovate germs, approximating: styles united at top: stigma capitate, convex, five-cornered, with the corners notched: the pericarpium consists of two large follicles, oblong, ventricose, one-celled, one-valved, glued together at the tip: the seeds very many, imbricated, crowned with a down: the receptacle longitudinal, filiform.

The species cultivated are: 1. *P. Græca*, Common Virginian Silk or Periploca; 2. *P. Secamone*, Green Periploca; 3. *P. Indica*, Indian Periploca; 4. *P. Africana*, African Periploca.

The first has the stems shrubby, twining round any support more than forty feet in height, covered with a dark bark, and sending out slender branches which twine round each other: the leaves are ovate-lanceolate, near four inches long,

and two broad in the middle, of a lucid green on their upper side, but pale on their under, opposite, on short footstalks: the flowers come out towards the ends of the small branches in bunches, and are of a purple colour. It is a native of Syria, flowering in July and August, but rarely ripening seeds in this climate.

It is sometimes called *Climbing Dog's-Bane*.

The second species has a twining, shrubby, even stem: the leaves are opposite, petioled, even, underneath paler, veined transversely: the panicles axillary, alternate, dichotomous, shorter than the leaves: the flowers are small. It differs obviously from the first sort in its small copious flowers. It is said to be a native of Egypt; but its place of growth is uncertain; flowering in July.

The third has many slender stalks, which twine about each other, and by a shrub or other support will rise near three feet high, putting out several small side-branches; these are hairy, as are also the leaves; which are about three quarters of an inch long, and half an inch broad, standing by pairs upon very short footstalks: the flowers come out in small bunches from the side of the stalks; are small, of a dull purple colour, and have a sweet scent. It flowers in the summer, but does not produce seeds in this climate. It is a native of the Cape.

There is a variety with smooth leaves and stalks, which comes from the same place.

Culture.—These plants may be easily increased by layers made from the young wood in the early spring or summer season. When they are fully rooted, they may be taken off and planted out, the first or hardy kind, either where they are to remain, or in the nursery, to be afterwards removed; and the two last, or tender sorts, into pots, to be protected during the winter.

The first sort likewise often succeeds by cuttings, and also the two last by the use of the hot-bed.

They may all be increased also by sowing the seeds procured from abroad in pots of light earth, plunging them in the hot-bed.

They should all be placed near support, to prevent their trailing upon the ground and fastening about other plants.

Where the two last sorts are kept constantly plunged in the tan-bed of the stove, they thrive and flower much better than in any other situation; but they should not be kept too warm in winter; and in the summer they should have a large share of free air admitted to them; for when they are kept too close their leaves will be covered with insects, and the plants become sickly in a short time.

The first sorts only require a little protection

in the winter. They all afford variety among potted plants.

PERIWINKLE. See VINCA.

PEROLA. See MOMORDICA.

PERSEA. See LAURUS.

PERSIAN LILY. See FRITILLARIA.

PERSICA. See AMYGDALUS.

PERSICARIA. See POLYGONUM.

PERUVIAN MASTICK TREE. See SCHTUNUS.

PETIVERIA, a genus containing plants of the woody exotic perennial evergreen kind for the stove.

It belongs to the class and order *Hexandria Tetragynia* (*Heptandria Monogynia*), and ranks in the natural order of *Holotaceae*.

The characters are: that the calyx is a four-leaved perianthium: leaflets linear, blunt, equal, spreading, permanent: there is no corolla (except the coloured calyx): the stamina have six or eight unequal, awl-shaped, converging filaments: anthers erect, linear-sagittate, bifid at top: the pistillum is an ovate germ, compressed, emarginate: style very short, lateral, in the groove of the germ: styles four, permanent, finally bent outwards, spinescent: stigma pencil-shaped: there is no pericarpium, except the crust over the seed: the seed single, oblong, narrower below, roundish, compressed, emarginate; with four barbed hooks, bent back outwards, rigid, acute, the middle ones longer (naked, but armed above with reflex spines).

The species are: 1. *P. alliacea*, Common Guinea-Hen Weed; 2. *P. octandra*, Dwarf Guinea-Hen Weed.

The first has a strong root, striking deep into the ground: the stems from two to three feet high, jointed, and becoming woody at bottom: the leaves oblong, three inches long and an inch and half broad, of a deep green and veined, placed alternately on short footstalks: the flowers are produced in slender spikes at the ends of the branches; are very small, and make no figure. It is common in the West Indies, flowering here in June.

It thrives most in a dry gravelly soil and a shady situation.

The second species differs from the first, in having a shorter and narrower stalk; and in the flowers having eight stamens; and, according to Linnaeus, the leaves are more rigid and quite smooth, the filaments purple and not white. It is a native of the West Indies.

Culture.—These plants may be increased by slips or cuttings planted out in the summer, as well as by seeds; which must be sown on a hot-bed early in the spring. When the plants are

come up, they should be removed into separate pots, and plunged into a moderate hot-bed. When the plants have obtained a good share of strength, they should be inured by degrees to the open air, into which they may be removed towards the end of June, placing them in a warm situation, where they may remain till autumn, when they must be placed in the stove, and during winter have a moderate degree of warmth.

They afford variety, and produce a good effect among other potted plants.

PETOLA. See MOMORDICA.

PETREA, a genus containing a plant of the climbing exotic shrubby kind for the stove.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatae*.

The characters are: that the calyx is a one-leaved, bell-shaped perianthium: border five-parted, spreading, very large, coloured, permanent: segments oblong, blunt, closed at the throat by five doubled, truncated scales; the corolla one-petalled, wheel-shaped, unequal, less than the calyx: tube very short: border flat, five-cleft: segments rounded, almost equal, spreading very much; the middle one larger and of a different colour: the stamens have four filaments, concealed within the tube of the corolla, ascending, two shorter: anthers oval, erect: the pistillum is an ovate germ: style simple, the length of the stamens: stigma blunt: the pericarpium is a capsule obovate, flat at top, two-celled, concealed at the bottom of the calyx: the seed single, fleshy.

The species is *P. volubilis*, Twining Petrea.

This rises with a woody stalk to the height of fifteen or sixteen feet, covered with a light-gray bark, and sending out several long branches, having a whiter bark than the stem: the leaves are at each joint, on the lower part of the branches placed by threes, but higher up by pairs; are five inches long, and two inches and a half broad in the middle, drawing to a point at each end; stiff, and their surface is rough, of a light green, having a strong dark midrib, with several transverse veins running to the borders, which are entire: the flowers are produced at the ends of the branches in loose bunches, nine or ten inches long; each flower upon a slender pedicel about an inch in length, of a fine blue colour.

There is a variety with bright blue petals.

Culture.—This is increased by seeds, which must be obtained from the places where the trees grow naturally, and be sown in pots plunged in a good hot-bed; and when the plants come up, they should be each planted in a sepa-

rate small pot filled with light loamy earth, and replunged into a hot-bed of tanner's bark, and be afterwards placed in the bark-bed in the stove, where they must constantly remain, and be treated like other plants of the same country.

They afford ornament in stove collections.

PETTY WHIN. See GENISTA.

PHASEOLUS, a genus containing plants of the climbing esculent and flowering kinds.

It belongs to the class and order *Diadelphica Decandria*, and ranks in the natural order of *Papilionaceae* or *Leguminosae*.

The characters are: that the calyx is a one-leaved, two-lipped perianthium: upper lip emarginate; lower three-toothed: the corolla papilionaceous: banner heart-shaped, blunt, emarginate, reclined; the side bent back: wings ovate, the length of the banner, placed on long claws: keel narrow, rolled spirally contrary to the sun: the stamens have diadelphous filaments, (simple and nine-cleft,) within the keel, spiral: anthers ten, simple: the pistillum is an oblong germ, compressed, villose: style filiform, bent in spirally, pubescent above: stigma blunt, thickish, villose: the pericarpium is a legume long, straight, coriaceous, blunt with a point: the seeds kidney-form, oblong, compressed.

The species is *P. vulgaris*, Common Kidney-Bean.

Other species may be cultivated for the purpose of variety as flower-plants.

It has the stem more or less twining, but in some of the cultivated dwarf varieties scarcely at all so, quite simple or unbranched: the leaves ternate, acuminate, rounded at the base, rough, on long petioles: the flowers axillary, in twin racemes, or else on twin petioles: corolla white, yellow, purple or red: the banner has a callus, but a small one, and placed near the edge above the claw: there is a white nectariferous scale between the claw of the banner and the single stamen, bent upwards, and growing to the filament: besides this, an obliquely bell-shaped, pellucid, striated nectary surrounds the pedicel of the germ within the connate filament; the size differs in the several varieties: the legume oblong, swelling a little at the seeds, when ripe one-celled: the seeds several, ovate or oblong kidney-shaped, smooth and shining; varying much in shape and size, but particularly in colour; being white, black, blue, red, and variously spotted. It is annual, and a native of both the Indies.

They were formerly called *Sperage Beans*, *French Beans*, &c.

The principal sub-varieties of the dwarf, or low-growing sorts, are: the early white dwarf,

the early speckled dwarf; the early yellow; the early liver-coloured; the early dun-coloured dwarf; the larger white or cream-coloured dwarf; the larger black and white speckled dwarf; the black-streaked dwarf; the red speckled dwarf; the speckled amber dwarf; the sparrow-egg dwarf; the Canterbury white dwarf; the Battersea white dwarf; the China speckled dwarf, consisting of black and white speckled, brown and white, red and white, &c. These are of upright dwarf bushy growth, rarely exceeding fifteen or eighteen inches in height; and seldom throw out runners, except the Canterbury and Battersea sorts, which sometimes send out a few stragglers, but which seldom extend to much distance.

The first three or four sorts are at present in most esteem for their coming early into bearing: being of smaller growth than the other sorts, they sooner form themselves for blossom and bearing, of course are proper for planting for the earliest crops, and for forcing in hot-beds, &c. As they, however, do not continue long in bearing, they are not so proper for the main crops as the larger dwarf sorts; particularly the black and white speckled, the Canterbury and Battersea kinds, which are all excellent bearers; but the two latter most of all, and the pods are smaller, more numerous, and esteemed the sweetest eating of all the dwarf kinds whilst young, though the pods of the large white dwarf, and the speckled kind in particular, continue exceedingly good, even when of pretty large size, but superior in the latter, both in a more plentiful longer production, and goodness for eating, being excellent for a principal crop in a family garden; as are also the Battersea and Canterbury sorts, which should not be omitted on the same occasion; and these two varieties are in most esteem for general culture by the market-gardeners, for main crops, as being by them considered both the most profitable in bearing, and having a smaller pod, the most saleable in the markets: however, any of the other dwarf sorts are also proper to cultivate occasionally, for variety, both for private and public use.

There is a scarlet bean which is by some considered a distinct species, but probably a variety of this, the running or twining stalks of which, if properly supported, rise to the height of twelve or fourteen feet: the leaves are smaller than those of the common garden-bean: the flowers grow in large spikes, are much bigger, and of a deep scarlet colour: the pods are large and rough; and the seeds are purple marked with black, sometimes pure white.

The principal subvarieties of these are: the

large scarlet climber, which rises with many twining runners upon support, eight or ten to twelve or fifteen feet high, having numerous large clusters of scarlet flowers, succeeded by large, thick, rough, fleshy seed-pods, containing large, thick, purplish beans.

The large white climber; having large clusters of white flowers, large, thick, rough seed-pods, and white seed. These sorts are alike in respect to their growth, differing only in the colour of their flowers and seed, which is pretty permanent: they are great bearers; and the plants of the same crop continue in bearing from July or August until October; the pods, even when large, boiling exceedingly green, being remarkably tender and well flavoured.

The large Dutch climber, which rises with twining runners, upon support, ten or twelve feet high; numerous clusters of white flowers, succeeded by long, broad, compressed-flat, smooth pods, containing large, oblong, flat, white seed: this is also a very great bearer, but it does not continue near so long in production as the two former climbers; its pods, however, which are very long, smooth, and fleshy, boil exceedingly green, tender, and good: and, of the runner kind, it is a very desirable family bean, inferior to none for sweetness of flavour.

But the following sorts are of a more moderate growth. The negro runner: the Battersea white runner: and, the Canterbury runner; which, though climbers, ramble less, but bear plentifully and continue some time. The pods are smaller, but very tender, very delicate in eating, while in moderate young growth.

Culture.—As these are all plants of the annual tender tribe, they require to be raised every year, in the latter spring and summer months, as from April till June or later, by different sowings, at the distance of a few weeks, when the danger of frosts is over.

Culture in the Dwarf Kinds.—In cultivating these sorts, proper kinds should be chosen for the different crops. As for the forward ones, any of the early sorts are proper, but the early white, early speckled, dun, and yellow kinds are rather the earliest bearers; and for the main crops any of the larger dwarf kinds, though preference should be given to the speckled, the Battersea, and the Canterbury dwarf kinds, as being all plentiful bearers, and continuing long in successional bearing on the same plants.

These sorts of beans, from their tender nature, seldom admit of being sown or planted earlier than April, when the weather is become a little settled; as the seed is not only impatient of cold moisture in the ground, and very subject

to rot, but the young plants that happen to come up early are often cut off, or greatly injured, by the morning frosts, or cold cutting winds, that frequently prevail in the beginning of this and the following month. But towards the middle of it, if the weather is fine and dry, some may be ventured in a warm dry situation and light soil, for the early natural crops; and in the latter end of it, or beginning of the following month, when the weather is suitable, it is proper to begin to put in the first general crops in the open quarters, &c., and to continue planting some every fortnight or three weeks until the middle or latter end of July; by which means regular supplies of young kidney-beans may be had for the table or market, from about the middle or latter end of June until the beginning of the autumn season.

Where, however, it is desired to try them as early as possible in the full ground, some may be put in about the beginning of April, in dry weather, close under a warm wall, or other similar situation where the soil is dry; and in a fortnight after some more, in a larger portion. If the first should fail, these sometimes succeed; and if both are attended with success, one will follow the other in bearing; though it is two to one against the success of the first planting. But as only a few should be planted so early, if they fail, it is only the loss of a little labour and seed, as the same ground will do again; and if they succeed and produce only a few but a week sooner than common, they will be esteemed a rarity, either for family use or the market.

They all succeed in any common dry soil of the garden; but for the forward crops, a dry light soil should constantly be chosen, rejecting heavy and wet grounds, for in such a soil most of the early-planted seed infallibly rot. Likewise for the early crops, it is highly requisite to have a sheltered warm situation full to the sun; a warm south border is a very proper exposure; but for the main crops, any of the open quarters may be made use of with propriety.

The methods of sowing or planting all the sorts is in shallow drills, from two to three feet asunder, to remain where sown.

For the early crops, taking advantage of a dry day, neat drills should be drawn with a hoe from north to south, two feet or thirty inches asunder, and near an inch deep; and to afford a greater chance of success, a drill may be made close along under the wall, where practicable; in these drills the beans should be dropped in rows along the bottoms, only about an inch and a half asunder, as many of this early sowing may fail; covering them evenly with the earth,

not more than an inch deep; as when covered too deep at an early period many are apt to rot, by the cold moist dampness of the earth. As soon as they are covered in, the surface should be lightly raked smooth; when the work is finished. They come up in about twelve days or a fortnight; when they should be managed as directed below; and the plants mostly come into bearing in six or eight weeks afterwards.

For the main crops to be planted afterwards, almost any situation, either in the borders, or an open exposure, may be employed; though an open situation in any of the large quarters is, as has been seen, the most proper. In this case drills should be drawn two feet and a half asunder, and about one inch deep; or, when it is designed to plant rows of savoys or cabbage-plants between, (as is often practised where necessary to husband the ground to the best advantage, but which should always be avoided if possible,) the drills should be a yard asunder at least; the beans being dropped in singly along the bottom of each drill, about two or three inches asunder, covering them in evenly afterwards with the earth about an inch deep, and finishing with a light raking to smooth the surface. They mostly come up at this season in ten or twelve days, and sometimes sooner in fine weather; and the plants usually come into plentiful bearing in six or eight weeks afterwards.

In planting out the later general crops, when the weather proves very dry and hot, and the ground of course very dry, it is proper either to soak the beans a few hours in soft water previous to planting; or, instead of this, letting the drills for the reception of the beans be well watered, and planting them immediately as above, covering them in the proper depth. Either of these methods is very advisable in dry weather in the heat of summer; it being necessary at such times to promote the free germination of the seed, in order to bring them up soon and regularly, as they would otherwise rise in a straggling manner.

In regard to the general Culture.—When the plants of all the above crops are come up, they are in general to remain where sown or planted; to yield their produce; though when necessary some may be transplanted, keeping them clean from weeds by occasional hoeing in dry weather; and when the plants are advanced about three or four inches high, hoeing up a little earth to their stems on each side, which will forward their growth and promote their strength; continuing the care of destroying weeds as often as their growth may render it necessary; which is principally all the culture required for these sorts, in the full ground, till they arrive at a bearing state, and

their produce is fit to gather; except to the earliest crops on warm sunny borders, in very dry hot weather, when it may be beneficial to give occasional waterings to the plants in the mornings or evenings, especially when in blossom, and fruiting.

In gathering the produce of these sorts of beans, it should always be performed when the pods are quite young, or at least before they become large, and the beans in them attain any considerable size, as they are then tough, stringy, and rank tasted; and in order to continue the plants in bearing as long as possible, the gatherings should be regularly repeated two or three times a week; for by gathering the pods often and clean, as they become fit, the plants blossom more abundantly, and continue fruiting more plentifully and for a much longer period.

Large quantities of these dwarf kinds are often cultivated in the gardens and fields in the neighbourhood of large towns, for supplying the markets during the latter part of the summer season.

Culture of early Crops by artificial Heat.—In order to have these sorts of beans as early as possible, recourse is had to raising them by the aid of heat, in two or three different methods, as by raising the plants in a hot-bed, an inch or two high, and then planting them out into a warm border, by raising and continuing the plants in a hot-bed so as to bear their crops, and by aid of a hot-house.

In the first of these methods, they may be forwarded a fortnight earlier than those sown entirely in the full-ground; for this purpose, towards the latter end of March, or early in the following month, a moderate hot-bed should be prepared a foot and a half or two feet in depth of dung, covered either with a frame or hand glasses, or arched over with hoops or rods, to be covered with mats; earthing the bed with fine, light, rich mould, six inches deep; then having some seed of the early sorts, it should be sown pretty close either all over the surface, an inch or two apart, covering them with earth about half an inch deep, or in small close drills, earthing them over the same depth; or where only a few are wanted, they may be sown in large pots at about an inch distance and half a one deep, and the pots plunged into a hot-bed, or placed in a hot-house; and when the plants come up, the pots be removed by degrees into the full air in warm days, to harden the plants for transplantation; and it is a good method to plant a quantity of beans in small pots (thirty-twos or forty-eights), three in each pot, plunging the pots in a hot-bed; and when the plants

are fit for being transplanted out, they can be readily turned out of the pots with the whole ball of earth about their roots, so as not to feel their removal. But in raising the plants in either of these methods with this view, attention is particularly necessary to inure them gradually to the full air, by taking off the covers of the glasses or mats in all mild weather from those in hot-beds, and only covering them in cold nights; or the pots in the hot-house should be placed abroad in fine days; but as they advance in growth, and the weather becomes warmer, they must be exposed by degrees to the full air, day and night, to harden them properly, previously to their being finally transplanted out. They should also be allowed frequent moderate refreshments of water.

When they have shot out their proper leaves an inch or two broad, and all danger of frosty mornings and other bad weather is apparently over, proceed to plant them out into a warm border, under a wall or other fence, taking them up with their roots as entire as possible, and with as much earth as will hang about them, or with a small ball of earth; and those raised in small pots by threes may also be easily turned out with the whole ball of earth entire; and as to the mode of planting them, those which cannot readily be taken up with balls may be planted by dibble, in a row along close under a south wall, or some in cross rows two feet asunder, forming shallow drills for their reception, in which the plants should be set three or four inches apart; but those with good balls about their roots should be holed in with a trowel; and if some of those for a small early production are also disposed in patches, three plants in each, so as to be covered occasionally in cold nights with hand-glasses, it will be found very beneficial in forwarding their growth. As soon as they are planted, in either method, a moderate watering should be given to settle the earth close about the roots, and repeated in dry weather as there may be occasion, till the plants have taken fresh root in their new situations.

After this they should be kept clean from weeds; and when they are a little advanced in growth, some earth drawn lightly up about their stems; and as the warm season advances, if it prove hot and dry, refreshments of water will greatly forward and strengthen the growth of the plants and forward their perfection.

In the second method—about the beginning or towards the middle of February a dung hot-bed should be made, either a small one in which to sow the beans thick for being transplanted, when the plants are about an inch high, into a larger

hot-bed, to remain for bearing; or a large one at first, in which to sow the seed and continue the plants to attain perfection, as for one, two, or more three-light frames, about two feet and a half high in dung: and when the great heat and steam are a little abated, the bed should be covered with light, rich, dry mould, six or eight inches thick, for the reception of the seed; then small drills should be drawn from the back to the front of the bed, near an inch deep, and about fifteen or eighteen inches asunder; placing the beans two or three inches apart, and covering them evenly with the earth the above depth, then putting on the lights, tilting them behind an inch or two high daily, to give vent to the steam; and when the plants appear, continuing every day to admit air to them at all opportunities, in proportion to the temperature of the weather and heat of the bed, to prevent their drawing up weak, and promote their strength as they rise in height; bestowing also at this time moderate refreshments of water in sunny days; and when they are two or three inches high, applying a little earth to their shanks; likewise supporting a moderate heat in the bed during the cold weather, by occasional linings of hot dung: and accordingly as the plants advance in growth, and the warm season increases, augmenting gradually the portion of fresh air daily to harden them by degrees, so as almost to be fully exposed occasionally in very warm days, especially when beginning to blossom; but keeping them close on nights; continuing also the care of frequent light waterings, which must be increased in quantity as the plants advance in size, particularly when they are in blossom and in a fruiting state: in their advanced growth, if they press much against the glasses of the frame, it is proper to raise it at bottom two or three inches, to give room at top for their free growth, which is necessary to promote a plentiful bloom for furnishing a sufficiently full crop of beans.

In this mode they may be had at as early a period as possible, as in April or early in May; but to have a constant succession of early kidney-beans till crops in the natural-ground come in, another crop should be brought forward in hot-beds, as above, in three weeks after the first hot-bed is made up.

Where frames cannot be afforded for the above purpose, it may be effected in March with occasional coverings of mats; a hot-bed being made about two feet high of dung, earthing it directly six or seven inches thick, sowing the beans as directed above, then arching the bed over with hoops, &c., and covering it every night, and in all bad weather, with mats; but

admitting the free air every mild day, gradually hardening the plants as they acquire strength, and giving occasional waterings.

In the third method—early kidney-beans may be obtained with very little trouble at almost any time in winter or spring, by raising them in pots, or long narrow trough-like boxes, about two or three feet long and eight or ten inches broad at top, placing them any where in the lower part of the hot-house; when the plants will succeed.

The proper kinds for this purpose are: the early white, yellow, and dun-coloured dwarfs, the latter being rather a preferable bearer, continuing in longer production; and the speckled dwarf also succeeds very well, and continues long in bearing in this mode of culture.

In respect to the method of management in these cases, any time in winter or early in spring, some large pots (sixteens or twenty-fours) or boxes may be filled with light rich earth, and placed in the hot-house, some being arranged upon the top of the surrounding wall of the bark-bed, and on the top of the front flues towards the upright glasses, and in other similar convenient situations as room may admit, planting in each pot four beans, near an inch deep; or, if boxes, along the middle, in a sort of double row, triangular-ways, about four inches asunder, and the above depth: they soon germinate, and in a few days appear above ground: when they begin to sprout, it is proper to moisten the mould with a little water, which facilitates the protrusion of the plants out of the earth.

Their after-culture is very easy:—when they are come up, frequent waterings should be given, as three times a week, as the earth dries very fast. It should always be kept moderately moist, in order that the plants may blossom freely and produce a plentiful crop, which is often in as great perfection as in the full-ground.

As in the other crops, they should be gathered often; as it is the way to continue the plants long in a bearing state.

A regular succession of early young crops of these beans may be obtained in this way two or three months, by repeated sowings at the interval of about three weeks, so as to have young plants advancing in pots or boxes in two or three different degrees of growth succeeding each other.

Where there is not much stove-room, it may be proper to plant the beans for succession crops in small pots (forty-eights), three beans in each; and as these take up but little room, they may be stowed any where close together, or between the other larger pots: the plants will come up

and be advancing in growth, so as that when those of the preceding crops are going off, these may be readily turned out of the small pots with the whole ball of earth about their roots, and replanted into large pots, &c. to remain for fruiting, giving water at planting, and frequently afterwards, as above, in the first crop: by this practice a month's growth in the plants may be gained, and a constant succession of beans for the table be had.

Culture in the Climbing Kinds.—These are raised from the seed, by sowing it annually in the later spring and summer months, as in the dwarf sorts. For this purpose the scarlet runner and the white sub-variety of it are the most proper for the general crops, as being not only very great bearers and continuing in perfection two or three months, but from their pods, when even pretty large, remaining green, fleshy, tender, and well flavoured. Some of the Dutch runners, and any of the other climbers, may also be cultivated with advantage.

The most proper season to begin planting the main crops of all those sorts is the first or second week in May, if the weather be fine; as being of a delicate nature like the dwarfs, when planted earlier, both the seed and plants are subject to danger from the same causes: however, in a south border, or some similar warm situation and dry soil, a few may be planted in the middle or towards the latter end of April, to take their chance; but for the general crops, the most successful season for planting is from the above period until the middle or latter end of June, but not later than the beginning of July: but where the scarlet kind and variety are planted principally, one planting in May or beginning of June will come into bearing in July or August; and when the pods are kept gathered clean, according as they are fit for use, the plants continue shooting, blossoming, and bearing abundantly until the end of September, and often until the end of October, or even till destroyed by the cold and frosts: but two plantings of any of the sorts of runners, one in May and the other in June, or early in July, are amply sufficient to furnish a very abundant supply for the whole season of this sort of crop.

All these kinds prosper almost any where in the garden, both in close and open situations; choosing principally a lightish soil, especially for the forward crops: and the richer the ground, the better it is for the purpose.

As all the running kinds require support of some kind or other to climb upon, they should be planted either in wide rows, for the convenience of placing tall sticks or poles along each

row for the runners of the plants to wind themselves round for support, or be planted against some sort of fence or treillage work for the same purpose of training up and supporting the runners. When, however, it is designed to train them upon sticks or poles, drills should be drawn four feet or four and a half asunder, especially for the larger kinds, and an inch deep, in which the beans should be dropped three or four inches apart; covering them in evenly with earth, and raking the surface smooth. The beans will sprout in a few days, and come up in less than a fortnight.

When the plants are three or four inches high, a little earth should be drawn with a hoe up to their stems, to strengthen them, and encourage them to send forth strong runners. At this time also all weeds between the rows should be cut up and be removed.

As soon as they begin to push forth their runners, some tall sticks or poles should be placed for them to ascend upon; and as they are placed, conducting the runners towards them, in a direction according to their natural mode of climbing, which is generally to the right, or contrary to the sun's motion: they will thus naturally encircle the sticks or poles, and ascend to their tops, even if ten or fifteen feet high, producing blossoms and fruit from bottom to top.

When it is intended to plant these sorts against fences for support, it should be done in a row close along to the fence; and if against a wall or paling, either placing tall poles, or drawing some strong packthreads from top to bottom at six inches distance; the plants readily twining round them, and supporting themselves to a great height.

In gathering the produce of all these kinds, the same circumstances should be attended to as in the dwarfs—to gather the pods whilst young and tender; and to continue the plants long in full bearing, always gathering the pods clean as they become of a proper size: and they will continue fruiting more abundantly and in better perfection.

When it is intended to cultivate any of these climbing beans as flowering-plants, the scarlet kind and its variety are the best sorts for the purpose. They should be sown as above in any of the compartments of the pleasure-garden, in patches, alternately scarlet and white sort, two or three beans in each patch, about an inch deep; and when the plants are up and begin to push forth runners, tall poles or branchy sticks should be placed for them to climb upon: they will thus effect a very fine variety all summer, until the autumn.

These kinds of beans are also often employed to run over arbours, and to twine round lines, from the top of tall stakes, and stems of small trees; also to run up along the sides of houses, or against walls, either upon poles, or upon packthread-strings, suspended from above, about which they will twine themselves many feet high, bearing abundance of flowers and fruit: they are likewise sometimes trained to form shady walks, by means of sticks or poles arranged along each side, or by support of a sort of treillage-work, ranging some tall stakes five or six feet asunder, railing them along the top with poles, or pan-tile laths, or extending strong packthread lines; and from either of which suspending strings to the ground, six or eight inches asunder, fastening them down with pegs: upon these strings the plants will climb, and form a close hedge; or they might be occasionally arched over the top in a similar manner, for the runners to extend, and form a vaulted roof and complete shade. Thus this fine climber may be trained in various ways according to fancy, both for use and ornament; from which those not accommodated with gardens may plant them in pots or boxes, to be placed in court-yards, windows, balconies, &c.

Saving Seed.—In order to have perfectly good seed, it is necessary to sow a sufficient quantity in rows on purpose, suffering the whole crop of the plants to remain without gathering any for use: by this means the seed ripens early, and in the highest perfection; which is essentially necessary for those who design the seed for public supply. In private gardens, and many others, they often, however, after having gathered the prime of the principal crops, leave the latter produce of them to grow for seed; which, although it may be tolerably good, is not always so large, plump, and fine, as in the former method.

When the seed is quite ripe, which is easily known by examining a few of the pods, the plants should be pulled up and spread loosely along in rows, or upon any low hedges, &c., turning them occasionally that the beans may dry and harden well; which when effected, either thrash them out directly, or lay them up in some dry loft or other room till convenient; and when thrashed out and cleared from the rubbish, spread them upon some clean airy floor, or some such place in the dry, to harden perfectly; then they should be put up in bags for next year's use:—some think the change of seed of this kind to be of much consequence.

PHILADELPHUS, a genus containing plants of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Icosandria*

Monogynia, and ranks in the natural order of *Hesperideæ*.

The characters are: that the calyx is a one-leaved perianthium, four- or five-parted, acuminate, permanent: the corolla has four or five roundish petals, flat, large, spreading: the stamina have twenty or twenty-five awl-shaped filaments, the length of the calyx: anthers erect, four-grooved: the pistillum is an inferior germ: style filiform, four- or five-parted: stigmas simple: the pericarpium is an ovate capsule, acuminate at both ends, naked at the top by the calyx being barked, four- or five-celled: partitions contrary: the seeds numerous, oblong, small, decumbent, arilled, fastened to the thickened edge of the partitions: arils club-shaped, acuminate, toothleted at the base.

The species is *P. coronarius*, Common Syringa or Mock Orange.

It is a shrub that sends up a great number of slender stalks from the root, seven or eight feet in height, having a gray bark, and putting forth several short branches from their sides: the leaves ovate or ovate-lanceolate; those upon the young shoots three inches and a half long, and two broad in the middle, terminating in acute points, and having several indentures on their edges; they are rough and of a deep green on their upper side, and pale on their under; stand opposite upon very short footstalks, and have the taste of fresh cucumbers: the flowers come out from the side, and at the end of the branches, in loose bunches, each on a short pedicel; they are white, and have a strong scent, which at some distance resembles that of orange-flowers; but near, it is too powerful for most persons: the flowers appear at the end of May, and continue a great part of June. It is a native, probably, of the South of Europe.

There are two varieties: the dwarf syringa, which seldom rises above three feet high: the leaves are shorter, more ovate, and little indented on their edges: the flowers come out singly from the side of the branches, and have a double or treble row of petals of the same size and form as the other, and the flowers have the same scent; but flowering very rarely, it is not so much in estimation.

The Carolina syringa, which rises with a shrubby stalk about sixteen feet high, sending out slender branches from the sides, opposite to each other: the leaves smooth, shaped like those of the pear-tree, entire, opposite, on pretty long footstalks: the flowers are produced at the ends of the branches; they are large, but without scent; each has four white oval petals spreading open, and a large calyx composed of four acute-pointed leaflets.



Painted by J. D. Edwards

London Published July 1866 by G. B. Keatsley, Fleet Street

Engraved by F. A. Smith

1 *Philadelphus crenarius*
Common Philadelphus

2 *Passiflora caerulea*
Common Passion Flower



Painted by J. Edwards

London Published Oct 1st 1805 by G. Kearsley Fleet Street.

Engraved by F. Ouseley

Philadelphus coronarius
 1 *Syringa* or Mock Orange

Polemonium coeruleum
 2 Blue Greek-Valerian

Culture.—These plants may be increased by suckers, layers, and cuttings.

The suckers are sent from the roots in great plenty; these should be taken from the old plants in autumn, and be planted in a nursery, to grow one or two years till they have obtained sufficient strength, when they may be removed to the places where they are to remain.

The layers may be laid down in the autumn, being made from the young twigs. These may be taken off in the following autumn, when well rooted, being planted out where they are to remain.

The cuttings of the young shoots may be planted in the autumn, in a shady situation, where they soon form plants.

The plants are extremely hardy, and thrive in almost any soil or situation, but grow taller in light good ground than in that which is stiff.

They are commonly disposed in plantations of flowering shrubs, among others of the same growth; mixing very well with lilacs, gelder roses, and laburnums; and particularly valuable from their thriving under the shade of trees, and forming a blockade against low buildings, where persons have no objection to their strong smell.

PHILLYREA, a genus containing plants of the hardy evergreen shrubby kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiariae*.

The characters are: that the calyx is a one-leaved perianthium, tubular, four-toothed, very small, permanent: the corolla one-petalled, funnel-form: tube scarcely any: border four-parted, revolute, acute; segments ovate: the stamina have two filaments, opposite, short: anthers simple, erect: the pistillum is a superior roundish germ: style simple, the length of the stamens: stigma thickish: the pericarpium is an ovate-globular, two-celled berry: the seeds solitary, flattish on one side, convex on the other, one of them frequently abortive.

The species are: 1. *P. media*, Lance-leaved Phillyrea; 2. *P. angustifolia*, Narrow-leaved Phillyrea; 3. *P. latifolia*, Broad-leaved Phillyrea.

The first rises to an equal height with the third or true sort, but the branches are more diffused, and have a darker bark: the leaves are of a darker green, are more than two inches long, and almost an inch and half broad, a little serrate on their edges, opposite on short footstalks: the flowers axillary, in long bunches, of an herbaceous white colour.

There are several varieties: namely, the privet-leaved and olive-leaved; which are of humbler

growth, seldom more than eight or ten feet high: the branches of the first are weaker, and spread wider, and are covered with a light brown bark: the leaves are stiff, almost two inches long, and half an inch broad in the middle, drawing to a point at both ends, and sit close to the branches: the flowers are in little axillary clusters, small and whiter. In the latter the branches are stronger, and spread out wider; the bark is of a lighter colour: the leaves are stiff, smooth, and entire, on very short footstalks, of a lucid green, and terminating in a point: the flowers in clusters, on pretty long peduncles, from the axils of the young branches, small and white. And in the Kew catalogue there are three other varieties mentioned: namely, the long-branched, which has long upright branches; the drooping, which has the branches hanging down and straddling; and the box-leaved.

The second species has the stalk ten or twelve feet high, sending out opposite branches, covered with a brown bark spotted with white: the leaves are smooth, stiff, narrow, entire, sessile, about an inch and half long, and half an inch broad in the middle, drawing to a point at both ends, of a light green, and pointing upwards: the flowers come out in large clusters at each joint of the branches, sitting close like whorled flowers, and almost surrounding them; they are small and white.

There is a variety termed rosemary-leaved, which is of humbler growth, seldom rising more than four or five feet high, sending out slender, opposite, straight branches, sparsely disposed: the leaves dark green, stiff, and entire; about an inch long, and not more than an eighth of an inch broad, sessile: the flowers are small, white, in clusters from the side of the branches: the berries very small, rarely ripening in this climate. And in the Kew catalogue another variety is mentioned, under the name of Dwarf Phillyrea.

The third, True or Smooth Broad-leaved, rises with a strong upright stem to the height of eighteen or twenty feet, dividing into several branches, covered with a smooth grayish bark: the leaves are entire (or obscurely serrate), firm, of a light green, an inch and half long, and an inch broad, on short footstalks: the flowers are axillary, on each side, of an herbaceous white colour, in small clusters; they come out in March, but being small make no great appearance.

There is a variety, the prickly broad-leaved, which is as high as the smooth one, and sends out several strong branches, which grow erect, and are covered with a gray bark: the leaves are an inch and half long, and an inch broad, firm,

of a lucid green, and serrate, each serrature ending in a spine. And the Kew Catalogue has another, under the name of *Ilex-leaved*.

Culture.—These plants are capable of being increased either from seeds or layers, but the latter being the most expeditious method is chiefly preferred in this climate.

The best season for laying them down is in autumn, when the ground should be dug round the stems of the plants intended to be layed, rendering it very loose; then making choice of a smooth part of the shoot, a slit should be made in it upwards, in the manner practised in laying carnations, bending the branch gently down to the ground, making a hollow place to receive it; and having placed the part which was slit into the ground, so as that the slit may be open, it should be fastened down with a forked stick that it may remain steady, covering that part of the branch with earth about three inches thick, keeping the upper part erect. The layers must be kept clean from weeds in the spring and summer following, as if suffered to grow up amongst them, they will prevent their taking root.

In the autumn following most of the plants thus laid will be rooted, at which time they may be taken off, and carefully planted in a nursery, where they may be trained three or four years in the manner they are intended to grow; during which time the ground should be dug between the rows, and be cut about the roots of the plants every year, to cause them to strike out strong fibres, so as to support a good ball of earth when they are removed. Their stems should likewise be well supported with stakes, in order to make them straight, otherwise they are very apt to grow crooked and unsightly. When they have been thus managed three or four years, they may be removed into the places where they are designed to remain. The best time for this is the end of September, or the beginning of October, but in removing them, their roots should be dug round; and all downright or strong roots, which have shot out to a great distance, be cut off, that they may have balls of earth preserved to their roots, otherwise they are liable to miscarry: and when placed in their new situations, some mulch should be laid upon the surface of the ground to prevent its drying.

The plants should likewise be supported with stakes until they have taken fast hold of the earth, to prevent their being turned out of the ground, or displaced by the winds, which destroy the fibres that are newly put out, and greatly injure the plants.

They delight in a middling soil, which is

neither too wet and stiff nor too dry, though the latter is to be preferred to the former, provided it be fresh. The sorts with small leaves are commonly two years before they take root when layed; therefore they should not be disturbed, as the raising them out of the ground greatly retards their rooting.

In the seed method, the seeds should be sown in the autumn soon after they are ripe, as when they are kept out of the ground till spring they do not grow the first year. They succeed best when sown in pots or boxes filled with light loamy earth, and placed under a garden frame where they may be screened from hard frost, but always exposed to the open air in mild weather. If the seeds are sown early in the autumn, the plants appear in the spring; but if they should not come up, the pots should be plunged into the ground in an east border, where they may only have the morning sun, in which situation they should remain the following summer; during which time they may be constantly kept clean from weeds, and in the autumn removed again under a frame for shelter in winter, and the spring following the plants will certainly come up, if the seeds were good. Towards the middle of April, the pots should be again plunged into the ground on an east border, to prevent the air from drying the earth through the pots, which is generally the case when the pots stand upon the ground; so that they must then be frequently watered, which should not be practised to these plants where it can be avoided. In the autumn following the plants should be carefully taken out of the pots and planted out in a nursery-bed, covering the surface with old tan to keep out the frost; and if the winter prove severe, they should be covered with mats: afterwards they may be treated as those from layers.

These shrubs are so hardy as to thrive in the open air in this climate, and are never injured except the winters are very severe, which sometimes causes their leaves to fall, and kills a few of the weaker branches, but these are repaired by new shoots the following summer; so that there are few evergreen trees which are hardier, or that more deserve to be cultivated for the purposes of ornament.

The first and third sorts and varieties are very proper to intermix with other evergreens of the same growth, to form clumps in pleasure-grounds and parks, or to plant round the borders of woods which are filled with deciduous trees, where in the summer time their dark shades make a fine contrast with the brighter green leaves of the deciduous trees; and in winter, when the latter are destitute of leaves, they have a

fine effect. These may be trained up to stems, so as to be out of the reach of cattle, and be planted in open places, where, if they are fenced against cattle till they are grown up, they may be afterwards exposed. The others, which are of humbler growth, should be confined to gardens or other inclosures, where they may be secured from cattle, &c. They should only have the irregular branches pruned in, occasionally as they want it.

PHLOMIS, a genus containing plants of the shrubby and under-shrubby evergreen kinds.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ* or *Labiatæ*.

The characters are: that the calyx is a one-leaved perianthium, tubular, oblong, five-cornered, toothed, permanent: involucre below the whorl: the corolla one-petalled, ringent: tube oblong: upper lip ovate, vaulted, incumbent, compressed, villous, obsoletely bifid: lower lip trifid: the middle segment larger, two-lobed, blunt; the side ones small, more acute: the stamina have four filaments, concealed under the upper lip, of which two are longer: anthers oblong: the pistillum is a four-parted germ: style the length and situation of the stamens: stigma bifid, acute; the lower cleft longer: there is no pericarpium: calyx containing the seeds at the bottom: the seeds four, oblong, three-sided.

The species are: 1. *P. fruticosa*, Shrubby Phlomis, or Jerusalem Sage; 2. *P. purpurea*, Sharp-leaved Purple Phlomis; 3. *P. Italica*, Blunt-leaved Purple Phlomis; 4. *P. Lychnitis*, Sage-leaved Phlomis; 5. *P. laciniata*, Jagged-leaved Phlomis; 6. *P. tuberosa*, Tuberous Phlomis; 7. *P. Zeylanica*, White Phlomis; 8. *P. nepetifolia*, Cat-mint-leaved Phlomis; 9. *P. leonurus*, Narrow-leaved Phlomis, or Lion's-Tail; 10. *P. Leonitis*, Dwarf Shrubby Phlomis.

The first has a pretty thick shrubby stalk, covered with a loose bark, rising five or six feet in height, and dividing into many irregular branches, which are four-cornered, woolly when young, and afterwards become woody: their joints are pretty far asunder; at each of these are placed two roundish leaves opposite, on short footstalks; they are woolly on their under side: the flowers come out in thick whorls round the stalks, and are yellow; they appear from June to August; but the seeds very rarely ripen in this climate. It grows naturally in Spain and Sicily.

There are two varieties: The Narrow-leaved shrubby Phlomis, or Jerusalem Sage, which does not rise so high as the above; the branches are weaker; the leaves longer, narrower and rounder; the whorls of flowers smaller, but the

flowers of the same shape and colour. These have been long cultivated under the title of French Sage, &c.

The Broad-leaved shrubby Phlomis, which has a shrubby stalk like the former, but much lower, seldom rising more than three feet and a half high, sending out branches on every side: the leaves hoary, broader than either of the former, of an oblong ovate form, on pretty long footstalks and whiter: the whorls large, with bigger flowers, the upper lip of which is very hairy.

The second species has the stem rather shrubby, erect, branched, slightly quadrangular, covered with thick wool, especially the younger branches: the leaves are opposite, ovate-oblong, obtuse, crenate, netted-veined, woolly on both sides, but most on the under one; the lowermost cut off at the base, but not heart-shaped, on long footstalks; the upper ones on shorter: the footstalks channelled, very woolly: the wool of the whole plant is formed like little stars: the whorls sessile in the axils of the upper leaves, consisting of six or eight flowers which are sessile, the same size with those of the first sort, but pale purple. It has a soapy smell, and is a native of Spain, flowering in June.

The third has the leaves less distinctly veined on the under side than in the second sort, and almost equally woolly on both sides, instead of being green on the upper; the lowermost are heart-shaped at the base: the bractes are blunt, by no means pungent; half as long as the calyx, which is also remarkably obtuse. It is a native of Italy and Portugal, flowering from June to August.

The fourth species has the habit of the first, but the leaves are narrower: the corolla is scarcely bigger than the calyx: the involucres linear, crinite with long hairs: the root is hard, thick, twisted: the leaves oblong, russet-coloured, cottony: the flowers of a golden colour, handsome, and very apparent: the bractes cordate, acuminate. It is a native of the South of France, &c., flowering from June to August.

The fifth has a perennial root: the stalk a foot and a half high which decays in the autumn, but the lower leaves continue all the year: the stem leaves are of the same shape with the lower, but smaller: the flowers in whorls: calyx downy: corolla of a dusky purple colour: they appear in June, but the seeds do not ripen in this climate. It was found in the Levant.

The sixth species has a tuberous root: the stalks are purple, four-cornered, five or six feet high: the leaves six inches long, three broad

at the base, terminating in acute points, deeply crenate on their edges: the flowers of a pale purple colour and hairy: they appear in June and July, and the seeds ripen in September; soon after which the stalks decay; but the roots abide many years. It is a native of Siberia.

The seventh species has the stem of the same stature with the ninth, two feet high, upright, herbaceous, four-cornered, blunt: the leaves sub-tomentose, marked with lines, petioled, remotely subserrate, longer than the internodes: the whorls sub-terminating with an awl-shaped involucre.

It is biennial, and a native of the East Indies, flowering from June to October.

The eighth has the stem simple, upright, quadrangular, blunt: the leaves deeply and somewhat bluntly serrate, green: the petioles the length of the leaves: the whorls few towards the top, globular, many-flowered: the calyx somewhat hairy, cylindrical, with a spiny and very sharp border, the upper tooth twice as large as the rest, and from four to six small teeth: the corolla villose, of the same appearance and colour with that of the ninth sort, but only one-third of the size; upper lip roundish, long, emarginate; lower short, trifid, even: involucre awl-shaped, reflex: filaments cohering in pairs: stigmas two, filiform, the upper shorter by half than the under. It is annual, and a native of the East Indies, flowering here in September and October.

The ninth species is a very handsome plant when it is in flower. It rises with a shrubby stalk seven or eight feet high, sending out several branches, which are four-cornered: the leaves are about three inches long, and half an inch broad, hairy on their upper side, and veined on their under: the branches have each two or three sessile whorls of flowers towards the ends: the corolla is of a tawny or golden colour, and shining like silk; upper lip long, tomentose, ciliate, quite entire; lower lip short, naked, membranaceous; the lateral segments reflex, dry, the intermediate one trifid, emarginate in the middle: the filaments snow-white: the anthers two-lobed, yellow, having globular meal sprinkled over them only at the base. It is a native of the Cape, flowering from October to December.

There is a variety of it with variegated leaves.

The tenth has the stalk shrubby, square, three feet high: branches four-cornered, in pairs: leaves rough on their upper side, veined, and pale green on their under: the corolla neither so long nor so deep coloured as in the ninth sort, to which it bears much resemblance, and is nearly allied; but the leaves are ovate, not lanceo-

late, and more tomentose: it differs materially from it by its awned calyxes: it agrees more with the eighth, but differs from it in having a shrubby stalk; small, blunt, more compact leaves; and the neck of the calyx rough-haired. It is a native of the Cape, flowering in June and July.

Culture.—All these plants may be increased by layers and cuttings.

The two first hardy sorts in particular grow freely by the first method: the young branches should be chosen, and laid in the common way, any time in autumn, spring, or summer; when they readily strike root, and commence proper plants by the autumn following, when they should be planted where they are to grow.

The cuttings should be made from the young shoots in spring and summer, being planted in a shady border, giving plenty of water in dry weather; when many of them will take root, and make good plants by the autumn following. The cuttings of the green-house kinds should, when made in the spring, be planted in pots, in order to be continued in shelter until May; or if the pots be plunged in a hot-bed, it will greatly forward their rooting; though, when the young shoots are planted in June or July, in a bed or border of rich earth, many of them take root, but may be much forwarded if covered down close with hand glasses, removing the glasses when the cuttings begin to shoot.

The fifth may likewise be increased by slips planted at the same time; and the sixth by offsets. The seventh should be preserved in the bark stove.

They are all very ornamental plants in the borders, green-house, and stove collections, according to the kinds.

PHLOX, a genus comprising plants of the herbaceous, fibrous-rooted, flowery, perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a one-leaved perianthium, cylindrical, ten-cornered, five-toothed, acute, permanent: the corolla one-petalled, salver-shaped: tube cylindrical, longer than the calyx, narrower below, curved in: border flat, five-parted: segments equal, blunt, shorter than the tube: the stamina have five filaments, within the tube of the corolla, two longer, one shorter: anthers in the throat of the corolla: the pistillum is a conical germ: style filiform, the length of the stamens: stigma trifid, acute: the pericarpium is an ovate capsule, three-cornered, three-celled, three-valved: the seeds solitary, ovate.



Painted by E. Edwards

London Published July 1st 1815, by G. Kneller Fleet Street

Engraved by F. Santen

1 *Phlox paniculata*
Panicled Lychnidea

2 *Polygala chamae-burus*
Box leaved Milkwort

3 *Physalis alkakengi*
Big Winter Cherry

The species are: 1. *P. paniculata*, Panicked Lychnidea; 2. *P. suaveolens*, White-flowered Lychnidea; 3. *P. maculata*, Spotted-stalked Lychnidea; 4. *P. pilosa*, Hairy-leaved Lychnidea; 5. *P. Carolina*, Carolina Lychnidea; 6. *P. glaberrima*, Smooth Lychnidea; 7. *P. divaricata*, Early-flowering Lychnidea.

The first has the stalk smooth, of a light green, about two feet high, sending out a few side branches: the leaves are near three inches long, and one broad in the middle, of a dark green, and sessile: the flowers in a terminating corymb, composed of many smaller bunches, which have each a distinct footstalk, and support a great number of flowers, which stand on short slender pedicels: the calyx short, cut almost to the bottom into five narrow acute segments: the corolla is pale purple, appearing late in July, and often followed by seeds which ripen in autumn. It is a native of North America, flowering in August and September.

The second species has white flowers, moderately sweet-scented. It is a native of North America, flowering in July and August.

The third has upright stalks, of a purplish colour, closely covered with white spots, and about three feet high: the leaves about three inches long, and one broad at their base, ending in acute points. Towards the upper part of the stalks are small branches opposite, each terminated by a small bunch of flowers; but on the top of the principal stalk is a long loose spike of flowers, composed of small bunches from the axils at each joint; each cluster having one common peduncle near an inch long, but the pedicels are short. The flowers are of a bright purple colour, and appear late in July: if the season be temperate, or the soil moist, they continue in beauty a great part of August, but rarely perfect seeds in this climate. It is a native of North America, flowering in August.

The fourth species has the stalks about a foot high: the leaves narrow-lanceolate, ending in acute points, sessile, a little hairy: the calyx cut into acute segments almost to the bottom: the tube of the corolla slender and pretty long, cut at top into five ovate spreading segments: the flowers light purple, appearing at the end of June, but seldom producing seeds in this climate. It is a native of North America.

The fifth resembles the sixth, but the stem is three times as high, and somewhat rugged: the leaves wider, and ovate-lanceolate: the corymb consisting of numerous flowers, with several peduncles from the uppermost axils of the leaves, erect, and fastigate into a sort of corymb of a dark purple colour. It grows naturally in Carolina, flowering from July to September.

The sixth species has the stalks near a foot and half high, dividing into three or four small branches towards the top, each terminated by a corymb of flowers: the lower leaves opposite, three inches long, and near half an inch broad at the base, ending in long acute points, smooth and sessile; the upper ones are alternate: the tube of the corolla twice the length of the calyx; segments of the border roundish, spreading, of a light purple colour: the flowers appear in June, but seldom produce seeds in this climate. It is a native of North America, flowering from June to August.

The seventh species has the stems almost upright, simple, and then divided into two branches: the leaves opposite on a simple stem, in five oppositions, softish, rugged; the upper ones alternate: the flowers from the partings of the stem and the axils of the alternate leaves, two together on separate pedicels: the calyx five-parted: the corollas pale blue, with a crooked tube: the flowers appear at the end of May, or beginning of June, but are rarely succeeded by seeds in this climate. It grows naturally in North America.

Culture.—These are generally increased by parting their roots, as they do not often produce seeds in this climate. The best time for performing this is in autumn, when the stalks begin to decay. The roots should not, however, be divided into too small heads, when they are expected to flower well the following summer; nor should they be parted oftener than every other year, as, when they are too often removed and parted, it greatly weakens the roots, so that they send out but few stalks, and those so weak as not to rise their usual height, and the bunches of flowers are much smaller.

The large root off-sets may be planted out at once where they are to remain; but the small ones in nursery-rows, for further increase in size.

When the roots are parted and removed, it is a good way to lay some old tan, or mulch, upon the surface of the ground about their roots, to prevent the frost from penetrating; for, as they will have put out new roots before winter, the frost, when it is severe, often kills the fibres, whereby the plants suffer greatly, and are sometimes wholly destroyed.

The first and sixth sorts may be increased pretty expeditiously by their spreading roots, but the others but slowly this way; of course it is a better method to have recourse to cuttings. The best season for planting the cuttings is about the end of April, or the beginning of the following month, when the young shoots from the roots, which are about two inches high, should

be cut off close to the ground, and their tops shortened, being then planted on a border of light loamy earth, and shaded from the sun until they have taken root; or if they are planted pretty close together, and covered with bell- or hand-glasses, or in pots, shading them every day from the sun, they will put out roots in five or six weeks; but on their beginning to shoot, the glasses should be gradually raised to admit the free air to them, otherwise they are apt to draw up weak, and soon spoil: as soon as they are well rooted, the glasses should be taken off, and the plants inured to the open air; being soon afterwards removed into a bed of good soil, planting them about six inches distance every way, shading them from the sun, and watering till they have taken new root; after which, when kept clean from weeds, they require no other care till autumn, when they should be removed into the borders or other parts, where they are designed to remain.

When some of the plants are put into pots, and sheltered under a hot-bed frame in winter, they flower stronger the following summer.

These plants succeed best in a moist rich mellow soil, growing taller, and flowering more strongly and in larger bunches. In poor dry soils they often die during the summer, when not constantly watered with care.

Some of the plants afford ornament in the borders, clumps, and other parts of pleasure-grounds; and those planted in pots to be placed in court-yards, or other places near the habitation, when they are in beauty, and being mixed with other flowers, are highly ornamental.

PHŒNIX, a genus containing a plant of the evergreen exotic tree kind.

It belongs to *Appendix Palmæ*, (*Diœcia Triandria*,) and ranks in the natural order of *Palmæ*, or *Palmæ*.

The characters are: that in the male flowers the calyx is an universal one-valved spathe: spadix branched: perianthium three-parted, very small, permanent: the corolla has three petals, concave, ovate, somewhat oblong: the stamina have three very short filaments: anthers linear, four-cornered, the length of the corolla: female flowers on a different plant, or on the same spadix: the calyx as in the male: the pistillum is a roundish germ: style awl-shaped, short: stigma acute: the pericarpium is an ovate, one-celled drupe: the seed single, bony, subovate, with a longitudinal groove.

The species is *P. dactylifera*, Date Palm-tree.

It rises to a great height in warm climates: the stalks are generally full of rugged knots, which are the vestiges of the decayed leaves, for

the trunks of these trees are not solid like other trees, but the centre is filled with pith, round which is a tough bark full of strong fibres while young, but as the trees grow old, this bark hardens and becomes woody: to it the leaves are closely joined, and in the centre rise erect, being closely folded or plaited together; but after they are advanced above the sheath which surrounds them, they expand very widely on every side the stem, and as the older leaves decay the stalk advances in height: the leaves when grown to a size for bearing fruit are six or eight feet long, and may be termed branches (for the trees have no other); these have narrow long leaves (or pinnae) set on alternately their whole length: the small leaves or lobes are towards the base three feet long, and little more than one inch broad; they are closely folded together when they first appear, and are wrapped round by brown fibres or threads, which fall off as the leaves advance, making way for them to expand; these never open flat, but are hollow like the keel of a boat, with a sharp ridge on their back; are very stiff, and, when young, of a bright green, ending with a sharp black spine. These trees have male flowers on different plants from those which produce the fruit, and there is a necessity for some of the male trees to grow near the females, to render them fruitful; or at least to impregnate the germ, without which the stones which are taken out of the fruit will not grow: the flowers of both sexes come out in very long bunches from the trunk between the leaves, and are covered with a spatha (or sheath) which opens and withers; those of the male have six short stamina, with narrow four-cornered anthers filled with farina. The female flowers have no stamina, but have a roundish germ, which afterwards becomes an oval berry, with a thick pulp inclosing a hard oblong stone, with a deep furrow running longitudinally: the bunches of fruit are sometimes very large. It is a native of the Levant.

Culture.—This plant may be increased by seed, procured from abroad, or taken out of the fruit, which should be sown as soon as possible in pots of light rich earth, plunging them in a tan hot-bed, or in the bark-bed in the stove, giving moderate waterings; when they soon come up; and when a few inches high, they should be pricked out into separate small pots, plunging them in the hot-bed or bark-bed; where they must remain, giving frequent waterings, and shifting them into larger pots, according as their progress of growth may require. When they are removed, great care should be taken not to injure their large roots, or to overpot them.

This, like the rest of the Palm tribe, has no other branches than its large leaves, each of which is composed of a leaf and branch, always arising from the top; and as the old leaves fall, the stem forms itself and advances in height; but although the leaves grow very tall in a few years, the stem advances but slowly, and can never be expected to arrive at a flowering and fruiting state in this climate: it, however, merits a place in the hot-house collections for its singularity.

The berries of this tree are the dates of the shops, which are imported from Africa and the countries in the Levant.

PHYLICA, a genus containing plants of the shrubby, evergreen, exotic kind. Bastard Alaternus.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a common receptacle of the fructifications collecting the flowers into a disk: perianthium proper one-leaved, five-cleft, turbinate, mouth villose, permanent: there is no corolla: scalelets five, acuminate, one at the base of each division of the calyx, converging: the stamina have five filaments, very small, inserted under the scalelet: anthers simple: the pistillum is a germ at the bottom of the corolla: style simple: stigma obtuse: the pericarpium is a roundish capsule, three-grained, three-celled, three-valved, crowned: the seeds solitary, roundish, gibbous on one side, angular on the other.

The species are: 1. *P. ericoides*, Heath-leaved Phylica; 2. *P. plumosa*, Woolly-leaved Phylica; 3. *P. luxifolia*, Box-leaved Phylica.

The first is a low bushy plant, seldom rising more than three feet high: the stalks are shrubby and irregular, dividing into many spreading branches, subdividing into smaller ones: the young branches are closely beset with short, narrow, acute-pointed, sessile leaves, of a dark green, and continuing all the year. At the end of every shoot, the flowers are produced in small clusters sitting close to the leaves; they are of a pure white, begin to appear in the autumn, continue in beauty all winter, and decay in spring. It grows naturally at the Cape, and the flowers are slightly odoriferous.

The second species has an erect shrubby stalk, which rises near three feet high, covered with a purplish bark, and here and there some white down upon it: the leaves are narrow, short, acute-pointed, sessile, alternate on every side, thick, nerved, dark green on their upper surface, but hoary on their under: flowers collected in small heads at the end of the branches, white,

woolly, fringed on their borders, cut into six acute segments at top. It flowers from March to May.

The third rises with a shrubby upright stalk five or six feet high, when old covered with a rough purplish bark, but the younger branches have a woolly down: the leaves are thick, the size of those of the box-tree, veined, smooth and of a lucid green on their upper side, but hoary on their under; they have short footstalks, and stand without order on the branches: the flowers are collected in small heads at the ends of the branches; they are of an herbaceous colour, and make no great appearance. It flowers during a great part of the year.

Culture.—They are chiefly increased by cuttings and slips of the young shoots.

In spring, as about March or April, a quantity of young cuttings, or slips of the small shoots, should be taken off, planting them in pots of rich earth, plunging them in a hot-bed, or in the bark-bed in the stove; giving frequent waterings, and occasional shade from the sun, when they will soon emit roots, and become proper plants fit for potting off separately in autumn: or the young cuttings or slips may be planted any time in summer, particularly in June and July, in pots as above, and placed under a hot-bed frame, or covered close with hand glasses, being watered and shaded; when they will also grow, but not be so forward as those of the spring planting.

They are somewhat tender plants, requiring shelter in winter in this climate: of course they must always be kept in pots, and placed among the green-house exotics, where they will effect a very agreeable variety at all seasons, and flower annually a great part of the autumn and winter, but do not produce seed in this climate.

PHYLLANTHUS, a genus furnishing plants of the evergreen exotic tree and shrubby kind. Sea-side Laurel.

It belongs to the class and order *Monoecia Triandria*, and ranks in the natural order of *Tricoccæ*.

The characters are: that the male calyx is a one-leaved perianthium, six-parted, bell-shaped, coloured: segments ovate, spreading, blunt, permanent: there is no corolla, except the calyx be called so: the stamina have three filaments, shorter than the calyx, approximating at the base, distant at the tips: anthers twin: females—the calyx a perianthium as in the males: there is no corolla: nectary a rim of twelve angles, surrounding the germ: the pistillum is a roundish germ, obtusely three-cornered: styles three, spreading, bifid: stigmas blunt: the pericarpium is a roundish capsule, three-grooved, three-celled;

cells bivalve : the seeds are solitary and roundish.

The species are : 1. *P. Niruri*, Annual Phyllanthus ; 2. *P. grandifolia* Great-leaved Phyllanthus ; 3. *P. Emblica*, Shrubby Phyllanthus.

The first has a filiform, long, white root : the stem herbaceous, about a foot high, branched, erect, roundish, even : the leaves alternate, distant, often only terminating : the petioles filiform, bearing both leaves and flowers : the leaflets contract every evening, turning their under side outwards : the flowers are produced on the under side of the leaves along the midrib, and turn downwards. It usually flowers here from June to October. It is common in Barbadoes.

The second species rises with a tree-like stem and branches : the leaves are large, ovate, obtuse, and entire. It is a native of North America.

The third rises in its native situation, with a tree-like stem, to the height of twelve or fourteen feet, but in this climate not more than half that height, sending out from the side many patulous branches : the leaves have very narrow leaflets. It has a berry-like fruit, and is a native of the Indies.

Culture.—These plants, where seeds can be procured from their native situations, may be raised in that way. They should be sown in pots filled with light earth, and plunged in a hot-bed ; and when the plants have acquired some growth, they should be planted out into separate pots filled with the same sort of mould ; being replunged in the hot-bed, due shade and water being given, until they become perfectly rooted ; after which they should be constantly kept in the bark-bed of the stove, and have the management of other plants of the same tender sort.

They may also sometimes be raised by planting out slips, or by layers managed in the same way as those from seeds.

They afford a fine variety in their beautiful foliage, and the flowery kinds have a singular effect in their flowers.

PHYLLIS, a genus containing plants of the shrubby evergreen exotic kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Stelatae*.

The characters are : that the calyx has no umbel (but a panicle) : perianthium very small, superior, two-leaved, obsolete : the corolla has five petals, lanceolate, obtuse, revolute, scarcely connected at the base : the stamina have five filaments, shorter than the corolla, capillary, flaccid : anthers simple, oblong : the pistillum

is an inferior germ : style none : stigmas two, awl-shaped, pubescent, reflex : there is no pericarpium : fruit turbinate-oblong, blunt, angular : the seeds two, parallel, convex and angular on one side, flat on the other, wider at top.

The species is *P. Nulla*, Bastard Hare's-Ear.

It rises with a soft shrubby stalk about two or three feet high, which is seldom thicker than a man's finger, of an herbaceous colour, and full of joints. These send out several small side branches towards the top, garnished with spear-shaped leaves near four inches long, and almost two broad in the middle, drawing to a point at each end ; they are of a lucid green on their upper side, but pale on their under, having a strong whitish midrib, with several deep veins running from it to the sides : the leaves are for the most part placed by threes round the branches, to which they sit close : the flowers are produced at the ends of the branches, in loose panicles ; are small, of an herbaceous colour at their first appearance, but before they fade, change to a brown or worn out purple, and are cut into five parts to their base, where they are connected, and fall off without separating. It is a native of the Canary Islands, flowering in June and July.

Culture.—The plants may be increased by sowing the seeds in the early spring months, as about March, in pots filled with light earth, and plunged in a hot-bed ; and when the plants have attained some growth, they should be planted out in separate pots, replunging them in the hot-bed, due shade being given till they become well rooted. In the summer season they should be set out in a sheltered situation, so as to have the morning sun, and be frequently watered. In the winter they must be well sheltered from frost, but have as much air as possible in mild weather.

In the second year, when the plants are shaken out of the pots and placed in a proper situation in the open ground, they flower better and afford more perfect seeds than when kept in pots.

They may also be raised by cuttings planted out in the summer season.

New plants should be raised every two or three years, as they do not last long.

They afford an agreeable variety among other evergreen plants of the green-house kind.

PHYSALIS, a genus comprising plants of the herbaceous and shrubby ornamental kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridae*.

The characters are : that the calyx is a one-leaved perianthium, ventricose, half-five-lobed,

small, five-cornered, with acuminate segments, permanent: the corolla one-petalled, wheel-shaped: tube very short: border half-five-cleft, large, plaited: segments wide, acute: the stamina have five filaments, awl-shaped, very small, converging: anthers erect, converging: the pistillum is a roundish germ: style filiform, generally longer than the stamens: stigma blunt: the pericarpium is a subglobular berry, two-celled, small, within a very large, inflated, closed, five-cornered, coloured calyx: the receptacle kidney-form, doubled: the seeds very many, kidney-form, compressed.

The species are: 1. *P. angulata*, Tooth-leaved Winter Cherry; 2. *P. pubescens*, Woolly Winter Cherry; 3. *P. Alkekengi*, Common Winter Cherry; 4. *P. Pennsylvanica*, Pennsylvanian Winter Cherry; 5. *P. viscosa*, Clammy Winter Cherry; 6. *P. somnifera*, Clustered Winter Cherry; 7. *P. flexuosa*, Flexuous Italian Winter Cherry; 8. *P. arborescens*, Tree-like Physalis, or Winter Cherry; 9. *P. Curassavica*, Curassavian Winter Cherry.

The first has a straight stem, the thickness of the little finger, about a foot high, three-cornered below, four-cornered above, as are also the branches, which come out obliquely from top to bottom, in alternate order, and are thicker at the base: the lower leaves wider and rounder than those about the middle of the stem, and these larger than those of the branches, deeply toothed or jagged: the flowers five-cornered, of an extremely pale yellow colour, with spots of a darker yellow at the base. It is a native of both the Indies, &c.

There is a variety which is taller, with entire leaves, smaller flowers of a paler yellow colour.

The second species branches out very wide close to the ground, and the branches frequently lie upon it; they are angular and full of joints, dividing again into smaller branches: the leaves are on pretty long footstalks, about three inches long and almost two broad, having several acute indentures on their edges: the flowers produced on the side of the branches upon short, slender, nodding peduncles; they are of an herbaceous yellow colour with dark bottoms, and are succeeded by large, swelling bladders; of a light green, inclosing berries as large as common cherries, which are yellowish when ripe. It flowers in July, and is a native of Virginia.

These are both annual plants.

The third has perennial roots, creeping to a great distance: they shoot up many stalks in the spring a foot high or more: the leaves of various shapes, some angular and obtuse, others oblong and acute-pointed, of a dark green, on long footstalks: the flowers axillary, on slender

peduncles, white, appearing in July; the berry round, the size of a small cherry, inclosed in the inflated calyx, which turns of a deep red in the autumn. It is a native of the South of Europe, &c.

The fourth species has many procumbent or erect stems, scarcely a foot in height, somewhat flexuose, roundish or obscurely angular on the top, at the flowers branched, having an obscure down scattered over them: the leaves are alternate, ovate, blunt, serrate-repand, almost naked above, obscurely tomentose underneath, next the flowers in pairs: the flowers axillary on very short peduncles, larger than those of the common sort, and of a pale yellow colour. They are succeeded by very small yellowish berries, which ripen in the autumn when the season proves warm. It is a native of North America, and flowers from July to September.

The fifth has a creeping root, sending up a great number of smooth stalks, about a foot high, dividing towards the top into small spreading branches: the leaves heart-shaped or ovate, about three inches long, and two broad near their base, entire, rough to the touch, of a pale yellowish green, alternate, on pretty long footstalks: the flowers are towards the top, axillary, on long slender peduncles, of a dirty yellow colour with purple bottoms. They appear in June and July, and are succeeded by viscous berries about the size of the common sort, of an herbaceous yellow colour, inclosed in a light-green swelling bladder. It is a native of America.

The sixth species rises with a shrubby stalk, near three feet high, dividing into several branches which grow erect, and are covered with a woolly down: the leaves ovate-lanceolate, almost three inches long, and an inch and a half broad in the middle, downy, and on short petioles: the flowers small, of an herbaceous white colour, sitting very close to the branches, and succeeded by small berries nearly of the same size as the common winter cherry, and red when ripe. It is a native of Spain, Sicily, &c., flowering in July and August.

The seventh rises to the height of five or six feet, sending out long flexuose branches covered with a gray bark: the leaves oblong-ovate, often placed opposite, sometimes by threes round the branches, to which they sit close: the flowers in clusters at the base of the petioles, small, of an herbaceous yellow colour: they are succeeded by round purplish berries having ten cells, each including one seed. It flowers in July and August, but not unless the season is warm. It is a native of the East Indies.

The eighth species has a shrubby stalk,

ten or twelve feet high, dividing towards the top into several small branches, covered with a gray hairy bark: leaves on the lower part alternate, but towards the end of the branches opposite; the lower leaves from three to four inches long, and two broad in the middle, drawing to a point at both ends; they are of a pale green, and downy: the flowers from the axils towards the end of the branches, one or two at the same joint opposite, on short nodding peduncles; are small, of a pale dirty yellow colour, with purple bottoms: berries small, spherical, red, inclosed in an oval dark-purple bladder. It flowers in June and July.

The ninth has a perennial creeping root: the stalks several, slender, about a foot high, becoming somewhat woody, but seldom lasting above two years; the leaves alternate, on short footstalks; they are about two inches long, and an inch and half broad: the flowers axillary towards the top, on short slender peduncles: petals small, sulphur-coloured with dark-purple bottoms: they appear in July and August, but are rarely succeeded by berries in this climate. It is a native of Curassao in the West Indies.

Culture.—These plants are all capable of being increased by seeds; the second, third, fourth, and fifth sorts, also by parting the roots; the sixth, seventh, eighth, and ninth, likewise by cuttings.

In the first sort, the seed should be sown in the early spring, as April, in pots of light earth, plunging them in a moderate hot-bed. When the plants have acquired a few inches in growth they should be removed into separate pots, gradually inuring them to the open air, in order that they may be removed with balls into the clumps or borders. But it is probably a better method to sow them in the latter end of May in the places where they are to remain, as they do not bear transplanting well.

They must be raised annually.

In the herbaceous kinds the seeds should be sown in the autumn as soon as they are ripe, or early in the spring, in the beds, borders, or clumps where they are to remain; or they may be transplanted into other beds to remain till the following autumn, when they may be removed to the situations where they are to remain.

The roots may be parted either in the early autumn or spring season, when the weather is mild. The divided parts should have root-fibres left at the bottoms and a bud in each at the tops in order to their succeeding properly.

In the sixth and seventh sorts, the seed should be sown in pots of light mould in the early spring and plunged in a mild hot-bed.

When the plants have had a little growth they should be pricked out into separate small pots, proper shade and water being given; being afterwards managed as the shrubby exotics of less-tender plants.

They may likewise be raised from cuttings, made in the later spring or summer months, which should be placed in pots of light mould and plunged in the hot-bed, due shade and water being given till they have stricken root.

And the two last sorts may be raised from seeds or cuttings in the same way, by the aid of the bark hot-bed of the stove.

The first and the other herbaceous sorts are curious ornamental plants in the borders, clumps, and other parts of pleasure-grounds, and the four best shrubby sorts in the green-house and stove collections.

PHYTOLACCA, a genus affording plants of the herbaceous hardy kinds.

It belongs to the class and order *Decandria Decagynia*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that there is no calyx, unless the corolla be called a coloured calyx: the corolla five petals, roundish, concave, spreading, bent in at top, permanent: the stamina have eight, ten, or twenty, awl-shaped filaments, the length of the corolla: anthers roundish, lateral: the pistillum is an orbiculate germ, depressed, divided externally by swellings, ending in eight or ten very short spreading-reflex styles: the pericarpium is an orbiculate berry, depressed, marked with ten longitudinal grooves, umbilicated with the pistils, and having as many cells: the seeds are solitary, kidney-form and smooth.

The species cultivated are: 1. *P. octandra*, White-flowered Phytolacca; 2. *P. decandra*, Branching Phytolacca, or Virginian Poke; 3. *P. icosandra*, Red Phytolacca; 4. *P. dioica*, Tree Phytolacca.

The first has the stalk herbaceous, two feet high, about the size of a man's finger, and divides at top into two or three short branches: the leaves ovate-lanceolate, near six inches long, and almost three broad; they have a strong midrib, and several transverse veins, are of a deep green, and the footstalks are an inch and half long: the peduncles come out from the side of the branches opposite to the leaves, are seven or eight inches long; the lower part, about two inches in length, is naked; the remainder has sessile flowers, white with a blush of purple in the middle, cut into five segments almost to the bottom, and having from eight to fourteen stamens, and ten styles: the berries flat, with ten deep furrows.

In some places it is found a palatable wholesome green: the tender stalks are frequently served up for young asparagus.

In the second species the root is very thick and fleshy, as large as a man's leg, divided into several thick fleshy branches, which run deep in the ground: the stems three or four, herbaceous, as large as a good walking-stick, of a purple colour, six or seven feet high, dividing into many branches at the top: the leaves five inches long, and two inches and a half broad, rounded at their base, but terminating in a point, placed without order on short footstalks; they are of a deep green, and in the autumn change to a purplish colour: the peduncles come out from the joints and divisions of the branches, and are about five inches long; the lower part is naked, but the upper half sustains a number of flowers ranged on each side like common currants. Each flower stands upon a pedicel half an inch long, and the petals are purplish: the berry depressed, with ten furrows. It flowers in July and August. It is a native of Switzerland, &c.

In some places the young shoots are boiled and eaten as spinach.

The third rises with an herbaceous stalk, from two to three feet high, with several longitudinal furrows, and changes at the end of summer to purple. It divides at top into three or four branches: the leaves are lanceolate, six or seven inches long, and almost three broad in the middle, of a deep green, on short footstalks; some are alternate, others opposite, and they are frequently oblique to the footstalk: the peduncles come out from the side of the branches opposite to the leaves; they are nine or ten inches long, the lower part being naked, but for a shorter space than in the other sorts; the upper part narrow and commonly inclined: the flowers are larger, white within, of an herbaceous colour on their edges, and purplish on the outside, on short pedicels.

The fruit is a globular berry. It is annual.

The fourth is a shrub two fathoms in height: the stem upright, a little branched, very thick, gray: the leaves scattered, oblong-ovate, acuminate, entire, smooth, flat or ascending on the sides, five inches long, and two inches and a half wide: the petioles spreading, cylindrical, reddish, equal to half the leaf in length: the racemes terminating, peduncled, solitary, pendulous, bracteate, six inches long: the flowers scattered, pedicelled, spreading very much, whitish green: the males five or six lines in breadth, the females smaller by half. Both the male and the female plants flower every spring,

but the latter is probably barren. It is a native of South America.

Culture.—The three first sorts may be increased by seeds, which should be sown in pots, in the spring, and plunged in a moderate hot-bed: when the plants have had a few inches growth, they should be removed into separate pots in the first and third sorts, but in the second into the borders or other parts, allowing them good room. The two former may be set out in warm borders or other places during the summer in the pots, being carefully watered, shaded, and kept free from weeds.

The fourth sort may be raised by planting cuttings in the summer season, in pots filled with light earth, plunging them in the bark hot-bed and covering the pots with hand glasses, proper shade being given. When well rooted, they should be removed into separate pots of a small size, re-plunging them in the hot-bed with proper shade till rooted, when they should be gradually inured to the open air, being removed into a moderate stove during the winter season.

They afford ornament and variety among potted plants of the stove kind; and the second sort, in the borders of the natural ground.

PIGEON PEA. See *CYTISUS*.

PIG-NUT. See *BUNIUM*.

PILEWORT. See *RANUNCULUS*.

PIMENTO. See *MYRTUS*.

PIMPERNEL. See *ANAGALLIS*.

PIMPINELLA, a genus containing a plant of the annual kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ* or *Umbellifera*.

The characters are: that the calyx is an universal umbel of many rays: partial of still more: involucre universal none: partial none: perianthium proper scarcely observable: the corolla universal almost uniform: florets all fertile: proper, petals five, inflex-cordate, almost equal: the stamina have five filaments, simple, longer than the corolet: anthers roundish: the pistillum is an inferior germ: styles two, very short: stigmas subglobular: there is no pericarpium: fruit ovate-oblong, bipartite: the seeds two, oblong, narrower towards the top, on one side convex and striated, on the other flat.

The species cultivated is *P. Anisum*, Anise.

It has an annual root: the lower leaves are divided into three lobes, which are deeply cut on their edges: the stem a foot and half high, dividing into several slender branches, which have narrow leaves on them, cut into three or four narrow segments: the umbels pretty large and

loose, on long peduncles: the flowers small, yellowish white: the seeds oblong, swelling. It flowers in July; and if the season prove warm the seeds will ripen in autumn. It is a native of Egypt.

The seeds have an aromatic smell, and a pleasant warm taste, accompanied with a considerable degree of sweetness.

Culture.—The seeds should be sown in the early part of April on a dry warm border, where the plants are to remain, being afterwards properly thinned out and kept free from weeds. These plants, however, seldom afford much profit by their seeds in this climate.

They produce variety in the borders, &c., of pleasure-grounds, as well as in pots in other places when cultivated in that way.

PINASTER. See PINUS.

PINEA. See PINUS.

PINE-APPLE. See BROMELIA.

PINE, SCREW. See PANDANUS.

PINE-TREE. See PINUS.

PINGVIN. See BROMELIA.

PINUS, a genus containing plants of the evergreen and deciduous tree-kinds.

It belongs to the class and order *Monoecia Monadelphica*, and ranks in the natural order of *Coniferae*.

The characters are: that the male flowers are disposed in racemes: the calyx has scales of the bud opening, and no other: there is no corolla: the stamina have very many filaments, connected at bottom into an upright column, divided at top: anthers erect, naked: female flowers on the same plant: calyx is a subovate strobile, consisting of scales which are two-flowered, oblong, imbricate, permanent, rigid: there is no corolla: the pistillum is a very small germ: style awl-shaped: stigma simple: there is no pericarpium: strobile serves for a calyx, having before been closed, but now only converging: the seed is a nut augmented by a membranaceous wing which is larger than the seed, but less than the scale of the strobile, oblong, straight on one side, gibbous on the other.

The species are: 1. *P. sylvestris*, Wild Pine-Tree; 2. *P. Pinaster*, Pinaster, or Cluster Pine-Tree; 3. *P. inops*, Jersey Pine-Tree; 4. *P. resinosa*, American Pitch Pine-Tree; 5. *P. halepensis*, Aleppo Pine-Tree; 6. *P. Pinea*, Stone Pine-Tree; 7. *P. Taeda*, Torch Pine, or Three-leaved Virginia Pine; 8. *P. palustris*, Swamp Pine-Tree; 9. *P. cembra*, Siberian Stone Pine-Tree; 10. *P. occidentalis*, West Indian Pine-Tree; 11. *P. Strobus*, Weymouth Pine-Tree; 12. *P. Cedrus*, Cedar of Lebanon; 13. *P. pendula*, Black Larch-Tree; 14. *P. Larix*, Com-

mon White Larch-Tree; 15. *P. Picea*, Silver Fir-Tree; 16. *P. Balsamea*, Balm of Gilead Fir-Tree; 17. *P. canadensis*, Hemlock Spruce Fir-Tree; 18. *P. nigra*, Black Spruce Fir-Tree; 19. *P. Abies*, Norway Spruce Fir-Tree; 20. *P. alba*, White Spruce Fir-Tree; 21. *P. orientalis*, Oriental Fir-Tree.

The first in a favourable soil grows to the height of eighty feet, with a straight trunk: the bark is of a brownish colour and full of crevices: the leaves issue from a white truncated little sheath in pairs; they are linear, acuminate, quite entire, striated, convex on one side, flat on the other, mucronate, bright green, smooth, from an inch and half to two inches or a little more in length, shorter than in the Pinaster and Stone-Pine, broader, twisted, and of a grayish colour: the scales of the male catkins roll back at top, and are feathered; the inner and upper scales of the cones gradually terminate in a short awn, but the lower scales have none; the scales open very readily; the cones small, pyramidal, ending in narrow points, of a light colour, with small seeds. It is here often called Scotch Fir, from its growing naturally in the mountains of Scotland; but is common in most parts of Europe, particularly in the northern parts. The wood affords the red or yellow deal, which is the most durable of any of the kinds yet known: the leaves are much shorter than those of the Pinaster and Stone Pine, broader, of a grayish colour and twisted: the cones are small, pyramidal, and end in narrow points; they are of a light colour, and the seeds are small.

The trunk affords masts to our navy, and from it and the branches tar and pitch are obtained, as also by incision barras, Burgundy pitch and turpentine.

There are several varieties: as the Tartarian, which has a great resemblance to it, but the leaves are broader, shorter, and their points are more obtuse; they emit a strong balsamic odour when bruised: the cones are very small, as are also the seeds, some of which are black, and others white. It grows naturally in Tartary.

The Mountain, or Mughoe, which has very narrow green leaves, grows sometimes by pairs, sometimes by threes from the same sheath, generally standing erect: the cones are of a middling size and pyramidal: the scales flat, having each a small obtuse rising, but very compact till they are opened by the warmth of the sun the second spring: the seeds of this are much less than those of the second sort, but larger than those of the first. It is a native of the Swiss mountains, where it is often called Torch Pine, growing to a great height.

The Sea Pine, which has smooth leaves: the cones are very long and slender; and the seeds are about the same size with those of the second species. It grows in the maritime parts of Italy, &c.

Others are likewise mentioned by writers.

The second species grows to a large size: the branches extend on every side to a considerable distance, and whilst the trees are young, they are fully furnished with leaves, especially when they are not so close as to exclude the air from those within; but as they advance in age the branches appear naked, and all those which are situated below become unsightly; for this reason, and because the timber is much preferable to it, the first species has been more generally cultivated. Its branches grow at a wider distance than those of the first sort, and are more horizontal: the leaves much larger, thicker, and longer, grow straight, have a broad surface on their inside, which has a furrow or channel running longitudinally; they are of a darker green and their points obtuse: the cones are seven or eight inches long, pyramidal, with pointed scales: the seeds oblong, a little flattened on their sides, and have narrower wings on their tops. It grows naturally in the mountains of Italy, &c.

The third never rises to any great height, and is the least esteemed in the country of all the sorts. While the trees are young they make a pretty good appearance, but when they get to the height of seven or eight feet they become ragged and unsightly, and are seldom worth cultivating in this climate. It is a native of North America.

The fourth species is also a native of North America, and may be cultivated in this climate.

The fifth species branches out on every side near the root; they at first grow horizontally, but turn their ends upwards; their bark is smooth and of a dark gray colour: the leaves are long and very narrow, of a dark green, and if they are bruised emit a strong resinous odour: the cones come out from the side of the branches; are not much more than half the length of those of the second species, but are full as large at their base: the scales are flattened, and the point of the cones obtuse: the seeds much less, but of the same shape. It is a native of Aleppo, &c.

The sixth has the leaves not quite so long as those of the second species, and of a grayish or sea-green colour: the cones are not more than five inches long, but very thick, roundish, and end obtusely: the scales are flat, and the seeds more than twice the size of those of the second

sort: the kernels are frequently served up in deserts during the winter season in Italy and the South of France.

It grows to a considerable height, with a straight and fair stem, but rough bark: the leaves contribute to diversify the scene in plantations, as they differ in colour from the other sorts, and are arranged in a different manner: the cones are very large and turbinate, striking the eye by their bold appearance when hanging on the trees; and when closely examined, afford ornament from the beautiful arrangement of their scales. It is a native of the South of France, &c., is chiefly grown for ornament and the kernels which it affords.

The seventh has very long narrow leaves, growing by threes out of each sheath: the cones are as large as those of the sixth sort, but more pointed, and the scales looser, opening horizontally and discharging the seeds. The wood of this tree is like that of the first sort, but has more resin. It is a native of North America, and is cultivated under the name of Frankincense Pine.

There are different varieties; as the Three-leaved Virginia, which has the leaves long, generally three in each sheath: the cones in clusters round the branches, as long as those of the second sort, but with rigid scales: the seeds also nearly as large as those of it. It grows naturally in Virginia, and other parts of North America, where it rises to a great height.

The others differ but little from this.

The eighth species, in its native swampy situation, grows to the height of twenty-five or thirty feet: the leaves are a foot or more in length, growing in tufts at the ends of the branches, having a singular appearance. The wood is of little use but for fuel. It is a native of Carolina and Georgia.

The ninth is often confounded with the sixth sort; but the cones of the latter are short and roundish, with close scales, whereas those of it are long and the scales looser: the leaves have a near resemblance; but the plants raised from seeds of that sort make much greater progress than this, which can scarcely be kept alive in this climate. It is a native of Switzerland, Siberia, &c.

The tenth species has been confounded with the eleventh sort, and is a native of Hispaniola.

The eleventh is one of the tallest species, often attaining a hundred feet in height in its native country: the bark is very smooth and delicate, especially whilst the tree is young: the leaves are long and slender; they are pretty closely placed on the branches, and make a fine

appearance: the cones are long, slender, and very loose, opening with the first warmth of the spring; so that if the seeds are not gathered in winter, the scales open and let them out: the wood is esteemed for masts of ships. It is often called the White and New England Pine, and is highly ornamental.

The twelfth species is a noble tree, which has a general striking character of growth so peculiar to itself that no other tree can possibly be mistaken for it. It is placed with the Larch, in the genus with Firs and Pines, as agreeing with the former in its foliage, with the latter in being evergreen. Its arms grow in time so weighty as often to bend the very stem and main shaft: the leaves much resemble those of the Larch, but are somewhat longer and closer set, erect, and perpetually green, which in that are not; but hanging down, dropping off, and deserting the tree in winter: the cones are tacked and ranged between the branch-leaves, in such order as nothing appears more curious and artificial, and at a little distance exceedingly beautiful: they have the bases rounder, shorter, or rather thicker, and with blunter points; the whole circumzoned, as it were, with pretty broad thick scales, which adhere together in exact series to the very summit, where they are somewhat smaller, but the entire lorication smoother couched than those of the Firs; within these repositories, under the scales, nestle the small nutting seeds, of a pear-shape: the cones grow upon the upper part of the branches, and stand erect, having a strong, woody, central style, by which they are firmly attached to the branch, so as with difficulty to be taken off; and which remains upon the branch after the cone is fallen to pieces, which never drops off whole, as in the Pine sort. It is a native of Mount Lebanon, &c., and is very lasting, being indestructible by insects.

The Cedar is now so far naturalized to our country as to produce ripe seeds; we may therefore have supplies without depending on the cones from the Levant: but it is found that they are more apt to produce and ripen their cones in hard winters than in mild ones; which is a plain indication that they will succeed even in the coldest seasons of the northern parts of the Island, where, as well as in the other parts, they might be propagated to great advantage.

The thirteenth sort is not much cultivated; but a particular sort of it has been brought from North America, which differs from the European sort in having darker shoots, but which has not long been known in Europe, though it grows plentifully in some of the north-

ern parts of America. As it does not promise to make so large trees as the European sort, it should be planted with those of lower growth, to make a variety. It endures the severest cold of this climate.

The fourteenth is of quick growth, rising to the height of fifty feet: the branches are slender, and their ends generally hang down: the leaves are long and narrow, in clusters from one point, spreading open above like the hairs of a painter's brush, of a light green, and falling off in autumn; in which circumstance this and the preceding differ from all the other species. In the month of April the male flowers appear, disposed in form of small cones: the female flowers are collected into egg-shaped obtuse cones, which in some have bright purple tops, but in others they are white; this difference is accidental, for seeds taken from either will produce plants of both sorts: the cones are about an inch long, and the scales are smooth; under each scale two winged seeds are generally lodged. It is a native of the South of Europe, and highly useful for planting in bleak situations, for the purpose of timber, &c.

There are different varieties:—the American, the Siberian, and the Chinese, require a colder climate than England, for the trees are apt to die in summer here, especially if they are planted on a dry soil: the cones of these which have been brought to England seem to be in general larger than those of the common sort; but there is so little difference between the trees in their characteristic notes, that they cannot be distinguished as different species, though in the growth of the trees there is a remarkable difference.

In the last, the cones are much larger than those of the common sort, and end in acute points: the scales prominent like those of the first species, and have little resemblance to those of the Larch. They are of a shrubby, spreading, but so hardy, as to thrive in the open air without any protection.

In the first, of which the branches are more slender, with a bark more inclining to yellow, and the scars more slender and clustered, the leaves are more tender, narrow, more glaucous, and the outer ones in each bundle shorter: cones only one-third of the size, blunt, with scales scarcely exceeding twelve in number, thinner, more shining, retuse-emarginate; the wings of the seeds are straight, more oblong, narrower, and, together with the seed itself, of a more diluted gray colour.

In the second, the bark of the branches is of an ash-coloured gray: the leaves a little wider, bright green, all nearly equal, commonly more

than forty in a bundle: the cones an inch long, with above thirty woody, striated, rounded, entire scales: the seeds brownish-gray, with sub-triangular wings somewhat bent in. In both, the cones are bent upwards on very short peduncles.

It is observed by the editor of Miller's Dictionary, that "no tree is more valuable, or better deserves our attention in planting than the Larch." It is a native of the South of Europe and Siberia.

The timber is not only used in houses, but in naval architecture also. "It seems to excel," he says, "for beams, doors, windows, and masts of ships: it resists the worm: being driven into the ground it is almost petrified, and will support an incredible weight: it bears polishing excellently well, and the turners abroad much desire it. It makes everlasting spouts, pent-houses and featheredge, which needs neither pitch or painting to preserve them; excellent pales, posts, rails, props for vines, &c.; to these we may add the pallettes on which painters separate and blend their colours.

The fifteenth species is a noble upright tree: the branches not very numerous, but the bark smooth and delicate: the upper surface of the leaves of a fine strong green, and their under has two white lines running lengthwise on each side of the midrib, giving the leaves a silvery look, from which it takes its name: the cones are large and grow erect, and when warm weather comes on soon shed their seeds: the scales wide, deltoid, rounded above, below beaked, and appendicled with a membranaceous spatulate dorsal ligule, terminated by a recurved dagger-point: the nuts rather large, membranaceous, variously angular, dun-coloured. It is a native of Switzerland, &c.

It has been observed in Ireland, that no tree grows so speedily to so large a size as the Silver Fir.—Some at forty years growth, in a wet clay on a rock, measuring twelve feet in circumference at the ground, and seven feet and a half at five feet high; one tree containing seventy-six feet of solid timber. The earl of Fife also remarks, that no trees make a greater progress than this and the Larch. It is found to be excellent for boat-building.

The sixteenth is a beautiful tree, which rises with an upright stem: the leaves are dark-green on their upper surface, and marked with whitish lines underneath: the cones are roundish and small: the buds and leaves are remarkably fragrant. From wounds made in this tree a very fine turpentine is obtained, which is sometimes sold for the true Balm of Gilead. It grows to

a large size in America, but has not done so in this climate.

It has very much the habit of the Silver Fir, but the leaves are wider and blunter, disposed on each side along the branches like the teeth of a comb, but in a double row, the upper one shorter than the under: underneath marked with a double glaucous line, and each has eight rows of white dots, and are often cloven at top. It is a native of Virginia.

The seventeenth species is a beautiful but delicate tree, and must have a good soil, with a warm situation; and it will be improved by tying its leading shoot to a stake annually as it advances.

It has the cone of the size and shape of a small hen's egg, and the whole of an ash-coloured bay: the scales coriaceous, thick, triangular, the outer side rounded and somewhat crenulate: the nuts a little smaller than in the Black Spruce, with a winged membrane on the outer side only. It is a native of many parts of North America, and does not thrive well in this climate.

The eighteenth, or Black Spruce, has shorter leaves, whiter on their under side than the White: the cones also are smaller and more compact. There is also a Red Spruce; but there seems to be no difference between this and the Black, either in the cones which have been brought from Newfoundland, or the young plants which have been raised in gardens in this climate.

The appellations of White and Black are given from the colour of the bark, as their is little difference in the colour of the wood, and the leaves of the Black are whiter on their under side than those of the White. They are both natives of North America;—the White upon the mountains; the Black upon the low grounds, generally in bogs or swamps. The first is by much the largest tree. This sort is easily known by its narrow leaves, placed on every side of the branches, and its long pendulous cones, which do not fall to pieces on the tree, but drop off entire the following summer: the scales open and emit the seeds on the first warmth of the spring.

There is a variety of this tree cultivated under the title of the Long-coned Cornish Fir, in which the leaves are longer, broader, of a lighter colour, and fuller on the branches: the cones also longer.

The nineteenth species is the loftiest of European trees, attaining a height from 125 to 150 feet, with a very straight trunk, and throwing out its spreading branches so as to form an

elegant pyramid: the leaves are clustered, without order, from an oblong cortical scale, four-cornered, drawn out into a sharp point, thickish, commonly curved a little; compressed, slightly keeled on both sides, shining on the upper surface: the male cones or catkins are ovate, scattered in the axils of the leaves, purple: the young female cones are also purple; and when ripe pendulous: they have eight rows of scales in a spiral, each row having from twenty to twenty-three scales, in each of which are two seeds. It is a native of Norway.

There are two principal varieties: the White and the Red, both of which afford the white deals. And *Burgundy Pitch* is prepared from the resin procured from this tree by boiling and straining it through a cloth.

There is no tree that yields greater profit than the Spruce Fir in cold land; no tree is more beautiful standing single on turf in large plantations, or more useful for shelter in cold soils and situations.

The twentieth is distinguished from the Black Spruce by the marks which have been given under the eighteenth species.

The twenty-first species was found in the Levant, and may be cultivated for variety.

Culture.—In all the sorts and varieties the increase is effected by means of seeds, which may be obtained from the well ripened cones by exposing them to the heat of a gentle fire or that of the sun, in which way the cells open and the seeds may be readily taken out. When the cones are not made use of in this way, they will remain several years without the seeds being injured, especially where they are close.

They should be sown in the early spring months, as March or the following month, on beds of fine earth, in a north-east aspect, or in large pots or boxes for the purpose of being occasionally removed into different situations as may be found necessary. They should be covered with nets to prevent the birds from pecking off the tops of the young plants, while the husks of the seeds are upon them; and be likewise screened from the heat of the sun at first.

All the sorts, except the Stone Pine and a few others, the scales of the cones of which are very hard, soon come up; but these frequently remain more than a year: the ground should therefore not be disturbed, being only kept clean from weeds in such cases.

Soaking the seeds in these cases may be useful, as well as sowing them in shaded situations.

The young plants in all the sorts should be kept quite clean and occasionally refreshed with

water when the season is dry, in a very gentle manner, so as not to disturb the plants.

When they come up too close the plants should be thinned out in the summer, the thinnings being planted out immediately in a separate bed, in a shady place, being gently watered as there may be occasion. They should be set out in rows at the distance of four or five, and three or four in the rows. The tender kinds should be sheltered during the winter by frames or mats from the frosts, but with the others it is unnecessary.

When the plants have remained in these beds a year or more according to circumstances, they should be removed into other rows in the nursery at the distance of two feet, and one or more in the rows. In this situation they should remain till the periods of their being finally planted out.

The best season for the removal of the plants in all cases is towards the latter end of March or the beginning of the following month.

Where it can be done, it is the best way not to let them remain too long in these nursery situations, as the plants are always found to succeed best when planted out before they have acquired too large a growth.

When large plantations are to be made it is advised by some to raise the plants on a portion of the same ground, or as nearly similar to it as possible.

It is advantageous when they are to remain to have a large size to transplant them every two years, as by that means they form better roots and such as spread out more laterally, and of course the plants may be afterwards removed with greater safety.

In removing the plants, at all times great care should be taken to preserve the roots as much as possible, as well as all the branches, without cutting them.

When they have been finally removed, they require little more trouble, it being only necessary to keep them perfectly free from weeds, and supporting the larger sorts of plants with proper stakes: all the sorts should be suffered to take their own natural growth; being careful to preserve their tops perfectly entire, to shoot up as fast as possible and to branch out in their own way as no pruning is wanted, unless in the lowermost branches in particular trees which are thought too low and straggling, when these may be occasionally trimmed, cutting them close to the stem; but pruning should be very sparingly practised to these resinous trees, as lopping the branches contributes to retard their growth as well as impair their beauty. In large forest

plantations, where the trees are arrived to a large growth, it is however customary to lop their lower branches gradually for faggots, according as they begin to decay; for where these trees stand close, the upper branches generally kill those below, so that the lower tiers decay gradually and successively; in which case these decaying lower branches may be lopped by degrees in winter.

After the plantations designed for timber-trees have had eight, ten, or twelve years' growth, it may be proper to begin to thin them; those thinned out may serve for many smaller purposes, being careful in thinning to leave a sufficiency of the finest plants standing at proper distances to grow up for timber.

These trees are all highly ornamental evergreens for the pleasure-grounds.

In regard to the distribution or arrangement of the trees in the plantations, and mode of planting, those designed for the shrubbery and for ornamental plantations may be disposed both in assemblage with other trees, and to form clumps, and continued plantations. Those intended as forest-trees should generally be disposed alone in considerable plantations. The method of planting them is the same as in other hardy trees; but where large plantations in out-grounds are intended either for pleasure or profit, there will not be any great necessity for a previous preparation of the soil, with respect to digging or ploughing, only just to dig a hole for each tree: the same rule may also be observed in planting clumps of them in lawns, parks, and other grass-grounds, the mould being made fine in the bottoms of them. Those designed principally for ornament should be disposed at such distances as that their branches may extend freely every way; as the beautiful display of the head is a great merit in these trees in such plantations: but those intended for timber plantations may be put only four or five feet distant, in order that they may draw one another up straight and tall more expeditiously, and to admit of a gradual thinning after a few years' growth, for poles, &c.

The proper methods of raising and planting out all the different sorts, in the view of affording timber or shelter in large plantations, may be seen in the new edition of Miller's Dictionary.

PIPER, a genus containing plants of the herbaceous shrubby perennial exotic kinds.

It belongs to the class and order *Diandria Trigynia*, and ranks in the natural order of *Piperitæ*.

The characters are: that the calyx has no

perfect spathe: spadix filiform, quite simple, covered with florets: perianthium none: there is no corolla: the stamina have no filaments: anthers two, opposite, at the root of the germ, roundish: the pistillum has a larger ovate germ: style none: stigma threefold, hispid: the pericarpium is a roundish one-celled berry: the seed single, globular.

The species are: 1. *P. nigrum*, Black Pepper; 2. *P. Amalago*, Rough-leaved Pepper; 3. *P. longum*, Long Pepper; 4. *P. methysticum*, Intoxicating Pepper, or Ava; 5. *P. reticulatum*, Netted-leaved Pepper; 6. *P. aduncum*, Hooked-spiked Pepper; 7. *P. pellucidum*, Pellucid-leaved Pepper; 8. *P. obtusifolium*, Blunt-leaved Pepper.

The first has a shrubby, very long, round, smooth, jointed stem, swelling towards each joint, slender, branched, scandent or trailing, rooted at the joints: the leaves acuminate, quite entire, equal at the base, flattish, bent back a little at the top and edges, alternate, of a dark green colour, at the joints of the branches upon strong sheath-like footstalks: the flowers sessile, lateral, and terminating, in simple, longish spikes, opposite to the leaves: the berry globular, of a red brown colour. It grows in the East Indies and CochinChina.

Martyn observes, that "White Pepper was formerly thought to be a different species from the Black; but it is nothing more than the ripe berries deprived of their skin, by steeping them about a fortnight in water; after which they are dried in the sun. The berries, falling to the ground when over-ripe, lose their outer coat, and are sold as an inferior sort of White Pepper."

The second species is a shrub from three to ten feet in height: stem even: branches dichotomous, jointed, subdivided, round, brownish green: the leaves alternate, acuminate, not oblique, nerved and veined, very thin, bright green, smooth, paler underneath: the petioles round, smooth: the joints swelling: the spikes peduncled, opposite to the leaves, filiform, loose, many-flowered: the flowers clustered: the berry sessile, containing a single seed, double the size of hempseed, black when ripe, of a taste slightly pungent. It is a native of Jamaica and Hispaniola.

The third has the stems shrubby, round, smooth, branched, slender, climbing, but not to any considerable height: the leaves differing much in size and form; but commonly heart-shaped, pointed, entire, smooth, nerved, deep green, alternate: the flowers small, in short dense terminating spikes, which are nearly cy-

lindrical: the berries are very small, and lodged in a pulpy matter: like those of Black Pepper they are first green, and become red when ripe; they are hottest to the taste in the immature state, and are therefore gathered whilst green, and dried in the sun, when they change to a blackish or dark gray colour. It is a native of the East Indies.

The fourth species has a dichotomous stem, spotted, attaining the height of a fathom: the leaves oblong-cordate, not roundish-cordate: the spikes straight, short, solitary, and not aggregate, long, and nodding. It is a native of the islands of the South Seas.

It has the property of intoxicating when chewed.

The fifth is a shrub: the stem about five feet high, sending out several side branches which have protuberant joints: the leaves six inches long and five broad near their base; they have five veins springing from the footstalk, the middle one going in a direct line to the point; the two side veins diverge towards the edges of the leaves in the middle, but approach again at the top; the surface of the leaves is full of small veins, which form a sort of net-work: the spikes come out from the side of the branches opposite to the leaves; they are slender, and about five inches long, a little bending in the middle, and are closely set with very small herbaceous flowers. It is a native of Jamaica.

The sixth species has the stems several, shrubby, round, knobbed at the joints, smooth, an inch and more in thickness, branched, ash-coloured, upright, eight feet high: the branchlets green, the thickness of a quill, spreading very much: the leaves alternate, on short petioles, in a double row, a little shorter at the inner base, deep green above, rugged backwards, rough-haired when examined by a glass; underneath pale green, villous but not rugged; quite entire, netted with numerous veins, many-nerved if the principal veins be considered as nerves; they are about half a foot in length, and have little taste or smell: the stipule lanceolate, acute, converging, smooth, striated, caducous: the peduncles alternate, opposite to a leaf, solitary, erect, round, somewhat villous, half an inch long: the spikes solitary, slender, yellowish, two or three inches in length, towards the origin of the branchlet bowed, so closely covered with minute fructifications, that it is scarcely possible to detect their structure even with a microscope. It is called Spanish Elder in Jamaica, where it is a native.

The seventh is annual: the stalks are succulent, seven or eight inches high: the leaves an

inch and half long, and three quarters of an inch broad: the spikes of flowers come out at the end of the stalks, are slender, about an inch long, and straight: the flowers are very small, and sessile, appear in July, and are succeeded by very small berries, each containing a small seed like dust. It is a native of South America.

The eighth species sends out from the root many succulent herbaceous stalks almost as large as a man's little finger; they are jointed, and divide into many branches, never rising above a foot high, but generally spread near the ground, putting out roots at each joint, propagate very fast, and soon cover a large space of ground: the leaves are very thick and succulent; they are about three inches long and two broad, very smooth and entire: the peduncle comes out at the end of the branches; this is also very succulent, and the whole length, including the spike, is about seven inches: the spike is straight, erect, and about the size of a goose-quill, closely covered with small flowers which require a glass to be distinguished; the whole spike much resembles the tail of a lizard. It is a native of South America, flowering from April to September.

Culture.—All these plants may be increased by seeds, procured fresh from the countries where the plants grow naturally, which should be sown upon a good hot-bed in the spring, and when the plants come up and are fit to transplant, be each put into a separate small pot filled with light fresh earth, and replunged into a hot-bed of tanner's bark, shading them every day from the sun till they have taken fresh root, when they must be treated in the same way as other tender exotic plants, admitting fresh air to them daily in proportion to the warmth of the season, to prevent their drawing up weak; and when the nights are cold the glasses of the hot-bed should be covered with mats.

They all require the constant protection of a hot-house.

As the stalks of most of them are tender when young, they should not have much wet, which rots them; and when water is given it must be with caution, not to beat down the plants; for when that is the case they seldom rise again, afterwards.

In some of the sorts they may be raised from layers or cuttings.

In the after-management of the plants, they must be plunged into the tan-bed of the bark-stove in the autumn, and during the winter be sparingly watered: they require the same warmth as the Coffee-tree. In the summer a large

share of fresh air must be admitted in hot weather, and they must be constantly kept in the stove, as suggested above.

They afford ornament and variety in stove-collections.

PIPER. See CAPSICUM.

PIPER JAMAICA. See MYRTUS PIMENTA.

PIPERIDGE TREE. See BERBERIS.

PISCIDIA, a genus furnishing plants of the exotic tree kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved, bell-shaped, five-toothed perianthium: the upper teeth nearer: the corolla papilionaceous: banner ascending, emarginate: wings the length of the banner: keel crescent-shaped, ascending: the stamina have ten filaments, uniting in a sheath cloven above: anthers oblong, incumbent: the pistillum is a pedicelled gerin, compressed, linear: style filiform, ascending: stigma acute: the pericarpium is a pedicelled legume, linear, with four longitudinal membranaceous angles, one-celled, separated by doubled isthmuses: the seeds some, subcylindric.

The species are: 1. *P. Erythrina*, Jamaica Dogwood Tree; 2. *P. Carthaginensis*, Carthaginian Piscidia.

The first in its native situation rises with a stem to the height of twenty-five feet or more, almost as large as a man's body, covered with a light-coloured smooth bark, and sending out several branches at the top without order: the leaves are pinnate, with seven leaflets for the most part, two inches long, and one inch and a half broad, commonly opposite: the flowers of a dirty white colour, succeeded by oblong pods, which have four longitudinal wings, and are jointed between the cells. It is a native of Jamaica.

The second species differs from the first in the shape and consistence of the leaves, which are more oblong and of a firmer texture; in other respects they are very similar. It is a native of the West Indies.

Culture.—They are capable of being increased by seeds, when they can be obtained fresh from the countries where they grow naturally. They should be sown upon a good hot-bed in the spring, and when the plants come up and are fit to transplant, be each planted in a small pot filled with light earth, and plunged into a hot-bed of tanner's bark, and afterwards treated in the same way as the other tender exotics of the same kind.

They afford variety in the stove.

PISONIA, a genus containing plants of the exotic tree kind for the stove.

It belongs to the class and order *Polygamia Dioecia*, (*Heptandria Monogynia*), and ranks in the natural order of *Nictagineæ*.

The characters are: that in the male—the calyx is scarcely any: the corolla one-petalled, bell-shaped, five-cleft: segments acute, patulous: the stamina have five, six, or seven awl-shaped filaments: anthers roundish, twin: the pistillum is an oblong germ: style short: stigma pencil-shaped: female—the calyx and corolla as in the male: the pistillum is an oblong germ: style simple, cylindrical, longer than the corolla, erect: stigmas bifid: the pericarpium is an oval berry, often five-cornered, valveless, one-celled: the seed single, smooth, oblong.

The species is *P. aculeata*, Prickly Pisonia.

The male and female plants differ considerably.

The first has stalks as thick as a man's arm, which rise ten or twelve feet high: the bark is of a dark brown colour, and smooth; these send out many branches by pairs opposite, which are much stronger than those of the female, and do not hang about so loose: they are garnished with obovate stiff leaves, an inch and a half long, and an inch and a quarter broad, standing opposite, on short footstalks. From the side of the branches come out short spurs, like those of the Pear-tree, having each two pairs of small leaves at bottom, and from the top comes out the peduncle, which is slender, about half an inch long, dividing at the top into three; each of these sustains a small corymb of herbaceous yellow flowers, each having five stamina standing out beyond the petal, terminated by obtuse anthers.

In the female the stalks are not so strong as those of the male, of course require support. These rise eighteen or twenty feet high, sending out slender weak branches opposite, which are armed with short, strong, hooked spines, and have small oval leaves, about an inch and three quarters broad; these stand opposite on the larger branches, but on the smaller they are alternate, and have short footstalks: the flowers are produced in small bunches at the ends of the branches, sitting upon the germ; they are shaped like those of the male, but have no stamina; in the centre is situated a cylindrical style, crowned with five spreading stigmas: the germs afterwards turn to a channelled, five-cornered, glutinous capsule, armed with small crooked spines, each containing one oblong, oval, smooth seed. It is a native of Jamaica, where it is called *Cock's-spur*, or *Fingrigo*; and flowers in March and April.

Culture.—It is increased by seeds, which should be sown in pots filled with light rich earth, and plunged into a hot-bed of tanner's bark; and when the plants come up, they should be transplanted into separate pots, and plunged into the hot-bed again, where they may remain till autumn, when they should be removed into the stove, and plunged into the bark-bed, and treated in the same manner as has been directed for several tender plants of the same country; in hot weather giving them plenty of water, but in winter more sparingly.

They are too tender to thrive in the open air of this country at any season of the year, they should therefore be constantly kept in the stove. They retain their leaves most part of the year in this climate.

They afford variety in stove collections of exotic plants.

PISTACHIA NUT. See **PISTACIA.**

PISTACIA, a genus containing plants of the exotic deciduous tree and shrubby evergreen kinds.

It belongs to the class and order *Dioecia Pentandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male—the calyx is a loose ament, scattered, compressed, of small one-flowered scalelets: perianthium proper, five-eleft, very small: there is no corolla: the stamina have five filaments, very small: anthers ovate, four-cornered, erect, patulous, large: female—the calyx ament none: perianthium trifid, very small: there is no corolla: the pistillum is an ovate germ, larger than the calyx; styles three, reflex: stigmas thickish, hispid: the pericarpium is a drupe dry, ovate: the seed is a nut ovate, smooth.

The species are: 1. *P. vera*, True Pistacia Tree; 2. *P. Terebinthus*, Common Turpentine Tree; 3. *P. Lentiscus*, Mastick Tree.

The first grows to the height of twenty-five or thirty feet; in its native situation the bark of the stem and old branches is of a dark russet colour, but that of the young branches is of a light brown: the leaves are composed of two or three pairs of leaflets terminated by an odd one; they approach towards an ovate shape, and their edges turn back. They emit an odour like that of the nut, when they are bruised. Some of the trees produce male flowers, others female; and some, when they are old, have both on the same tree. The male flowers come out from the side of the branches in loose bunches, and are of an herbaceous colour: the female flowers come out in the same manner in clusters. It is a native of Persia.

In the second species the situation of the buds is similar to that in the preceding species:

the leaflets seven, the middle ones for the most part larger, or the odd leaflet and the two inmost smaller than the four others; each ovate-oblong, by no means acuminate but styled, most of them also are wider on one side. It is by some described as a low shrub, but very thick: the wood is odorous and balsamic: the leaves have two pairs of leaflets, terminated by an odd one which is larger: they are firm, and shining on the upper surface: the flowers from branching catkins at the axils of the leaves, and are reddish. It is a native of Barbary and the South of Europe, flowering here in June and July.

The Cyprus or Chian Turpentine, which this tree furnishes, is procured by wounding the bark of the trunk in several places, during the month of July, leaving a space of about three inches between the wounds; from these the Turpentine is received on stones, upon which it becomes so much condensed by the coldness of the night, as to admit of being scraped off with a knife, which is always done before sun-rise: in order to free it from all extraneous admixture, it is again liquefied by the sun's heat, and passed through a strainer; it is then fit for use.

The third rises to the height of eighteen or twenty feet, the trunk being covered with a gray bark. It sends out many branches, which have a reddish brown bark: the leaves have three or four pairs of small leaflets, of a lucid green on their upper, but pale on their under side: the midrib has two narrow borders or wings running from one leaflet to another: the male flowers come out in loose clusters from the sides of the branches, are of an herbaceous colour, appear in May, and soon fall off; they are generally on different plants from the fruits, which also grow in clusters, and are small berries, of a black colour when ripe. It is a native of the South of Europe and the Levant.

There is a variety which rises to the same height as the preceding; but differs from it in having a pair or two of leaflets more to each leaf, much narrower and of a paler colour. It is a native of the country about Marseilles, &c.

Culture.—The first is capable of being increased by the seeds or nuts, procured from abroad and planted in the spring, in pots filled with light kitchen-garden earth, plunging them into a moderate hot-bed: when the plants appear, a large share of air should be admitted to them, to prevent their drawing up weak; and by degrees they should be hardened to bear the open air, to which they may be exposed from the beginning of June till autumn, when they should be placed under a hot-bed frame to screen them from the frost in winter; as while young, they are too tender to live through the winter in this climate.

without protection, but should always be exposed to the air in mild weather: they shed their leaves in autumn, and therefore should not have much wet in winter. In the spring, before the plants begin to shoot, they must be removed each into a separate small pot; and be plunged into a very moderate hot-bed, to forward their putting out new roots. As soon as they begin to shoot, they must be gradually hardened, and placed abroad again.

These plants may be kept in pots three or four years till they have got strength, during which time they should be sheltered in winter; and afterwards be turned out of the pots, and planted in the full ground, some against high walls to a warm aspect, and others in a sheltered situation, where they bear the cold of our ordinary winters very well, but in severe frosts are often liable to be destroyed. The trees flower and produce fruit, but the summers are seldom warm enough to ripen the nuts.

The third sort is also capable of being increased by laying down the young branches, which, if properly managed, put out roots in one year, and may be cut off from the old plants, and be planted out into separate small pots. These must be sheltered in winter, and in summer placed abroad in a sheltered situation, and treated in the same way as other hardy kinds of green-house plants.

When raised from seeds they should be taken from trees growing in the neighbourhood of the male plants, as otherwise they will not grow. When these plants have obtained strength, some of them may be turned out of the pots, and planted against warm walls; where, if their branches are trained against them, they endure ordinary winters very well, and with a little shelter in severe winters may be preserved with safety.

They are curious and ornamental in different situations.

- **PISUM**, a genus comprising plants of the hardy herbaceous kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved, five-cleft, acute, permanent perianthium: the two upper segments shorter: the corolla is papilionaceous: standard very broad, obcordate, reflex, emarginate with a point: wings two, roundish, converging, shorter than the standard: keel compressed, semilunar, shorter than the wings: stamina have diadelphous filaments; one simple, superior, flat, awl-shaped; and nine awl-shaped below the middle united into a

cylinder which is cloven at top: anthers roundish: the pistillum is an oblong, compressed germ: style ascending, triangular, membranaceous, keeled with the sides bent outwards: stigma growing to the upper angle, oblong, villose: the pericarpium is a large legume, long, roundish or compressed downwards, with the top acuminate upwards, one-celled, two-valved: the seeds several, globular.

The species are: 1. *P. sativum*, Common Pea; 2. *P. maritimum*, Sea Pea; 3. *P. Ochrus*, Yellow-flowered Pea.

The first has an annual, slender, fibrous root: the stems hollow whilst young, brittle, branched, smooth, weak, climbing by terminating tendrils: leaves abruptly pinnate, composed usually of two pairs of leaflets, which are oval and smooth: the stipules large, surrounding the stem or branch: the flowers lateral, two or three together on long peduncles: the corolla white, greenish white, purple or variegated: the legumes commonly in pairs, about two inches long, of an oblong form, smooth, swelling at the straight suture, where the seeds are fastened, flattened next the other suture, which arches, especially towards the end: the seeds from five or six to eight or nine, commonly globular, but in some varieties irregular or approaching to a cubic form, smooth, white, yellow, blue, gray, brown, or greenish, with a small oblong umbilicus: the colour of the whole plant is glaucous, or hoary green, from a white meal which covers it. It is said to be a native of the South of Europe.

There are two principal varieties, the white and gray; and several sub-varieties, the principal of which are:

Early kinds.—The Early Golden Hotspur; Early Charlton Hotspur; Nichols's Early Golden Hotspur; the Early Charlton; the Reading Hotspur; Masters's Hotspur; Ormrod's Hotspur; Early Dwarf Hotspur; Leadman's Dwarf; Fan Spanish Dwarf; Early Dwarf Frame Pea; Pearl Pea; Cluster Pea; Royal Green Pea; Essex Hotspur; the Dwarf Pea; the Sugar Pea.

Late kinds.—Spanish Morotto; Nonpareil; Sugar Dwarf; Sickle Pea; Marrowfat; Dwarf Marrowfat; Rose or Crown Pea; Rouncival Pea; Gray Pea; Large Gray Pea; Crooked Gray Pea; Long-bearing Pea; Green Field Pea; White Field Pea; Pig Pea.

Many of the first sub-varieties are very early, and, being low growers, require sticks of three or four feet only in height, and often not so much. New varieties of these are raised almost every year, which, because they differ in some

slight particular, are sold at an advanced price, and have frequently the names of the persons who raised them, or the place where they first grew. These varieties are not permanent, and without the greatest care will soon degenerate.

The second species has a perennial root, running far and deep among the stones or into the sand in every direction: the stems are procumbent, quadrangular, a little compressed, striated, smooth, leafy, many-flowered, glaucous, often reddish: the leaves alternate, alternately and abruptly pinnate, spreading: the leaflets sessile, oval, obtuse with a little point, entire, smooth, many-veined, glaucous; common footstalk flatish, striated, ending in a branched thread-shaped smooth tendril: the stipules two together, equal, acute, toothed at the base, of the texture and colour of the leaflets, but smaller: the clusters of flowers axillary, solitary, as long as the leaves, erect, many-flowered: the common peduncle round, striated, smooth: pedicels alternate, short, single-flowered: the flowers rather large, a little drooping: the corolla beautifully variegated with red and purple.

According to Mr. Woodward, the stems are slightly pubescent and short: leaves numerous: leaf-stalks angular, pubescent: leaflets alternate, on the lower leaves five or seven, upwards nine or eleven; there being always one more on the lower than on the upper side of the leaf-stalk, which is terminated by a tendril, sometimes simple, but oftener bifid at the extremity: stipules oval-lanceolate, broad, arrow-shaped at the base: flowers crowded on the summit of the naked peduncle: pods long and narrow.

It is remarked by Dr. Smith, that this species is almost as nearly allied to *Lathyrus* as to *Pisum*, both in habit and generic character; and that *Pisum sativum* is not more different in external appearance from the genus of *Lathyrus*, than *Vicia Faba* or the Bean is from the other *Viciæ*. These, however, he adds, are matters of opinion: and in so natural a class, it is very difficult to find out certain and obvious marks of distinction. It is a native of the sea-shores of Europe, &c.

The third has an annual root: the stalk is angular, near three feet high: the leaves on winged footstalks, each sustaining two oblong leaflets: the flowers are pale yellow, and small: the pods two inches long; containing five or six roundish seeds, a little compressed on their sides; these may be eaten green, but unless they are gathered very young, they are coarse, and at best not so good as the common Pea. It is a native of the South of Europe, and of the Levant. It flowers in June and July.

Culture in the open Ground.—All the sorts of the first kind are raised from seed, sown annually; and as those of one sowing continue but a short time in bearing, several sowings are requisite each season, to continue successions for the table all summer; each sowing to remain where sown, choosing a warm dry border, &c. for the earliest crops; and for the succeeding ones, any of the common quarters, in a free exposure, distant from the shade of trees, &c., but open to the sun.

For the late crops the more moist parts are the best.

The general season for sowing is any time in open weather, from the latter end of October, or in November, until May or June.

But in order to have green Peas as early as possible, recourse must be had to the assistance of hot-beds, by the aid of which they are obtained in March and April, and continued till the coming in of the natural ground crops, in the latter end of May or beginning of the following month.

The early and first general Crops.—Towards the latter end of October, in November or December, as the weather may be convenient, the earliest crops should be put into the ground. In warm soils and situations it is always advisable to sow a few in the two former months; but in general, and especially in open exposed grounds, November and December is time enough to begin the principal sowings. For this purpose the Earliest Charlton or Golden Hotspurs are the most proper.

And in order for their reception a warm south border, or some other dry, sheltered, sunny situation should be dug over and prepared; when, in a dry day, drills should be drawn by a line, ranging south and north, to enjoy the greater advantage of the sun's influence, making them an inch and a half deep, and two feet and a half at least asunder; but if designed for sticks, three feet and a half will be a more proper distance. Then the seed should be scattered in evenly along the middle of each drill, rather thickish, as they are liable to accidents from vermin and the season, covering them in regularly with the earth either with a rake or hoe, being careful that they are all equally covered the depth of the drills; and then with a rake lightly trim the surface smooth; which finishes the work.

The peas begin to germinate in a fortnight, if mild weather, and come up in three weeks or a month, but seldom in less time at this season; when the plants are to be managed as directed below.

Another sowing should be performed in three weeks or a month after this; or when the first was sowed in October or early in the following month, it is better to repeat the sowing in a fortnight or three weeks, for fear the first should fail; and after this continue sowing once in three weeks or a month all winter in mild weather. But towards spring a principal crop of the Reading and other large Hotspurs should be sown; and as the season advances, the sowings be made in more open exposures, and more in quantity than the early ones; and as the spring draws on, the sowings should also be repeated oftener; as from the close of the year till the beginning of April, they should be once in three weeks; and from that time till May, once a fortnight, especially as the warm weather increases.

The winter and early spring sowings differ materially in the time they require to germinate: those sown any time in winter are sometimes three weeks or near a month before they appear, while those sown towards spring come up much sooner in the later spring sowings, often in a very short time.

In the later of the above sowings, some of the dwarf sorts may be introduced; as Leadman's Dwarf, both for middle and late crops.

As the plants of each sowing come up, and are advanced two or three inches in height, it is proper to begin the first culture by drawing a little earth with a hoe, or small rake, lightly up to their stems on each side of the different rows to strengthen and forward their growth; repeating the earthing once or twice at proper intervals, as occasion may require, and at the same time cutting up and clearing away all weeds; and when the crops are six or eight inches in height, those designed for support should be sticked.

As the earliest crops are often in danger from the severity of frosts, it is proper, when they are about an inch or an inch and a half high, to draw a little fine earth lightly up to their stems in a dry day; it will also be of much advantage to give occasional protection to such crops in severe weather, by covering them lightly with long, light, dry litter, of the strawy kind, or by mats; which, where there is but a moderate quantity in warm borders, may be more easily effected; but this need only be practised in very severe frosts. They must however be carefully uncovered every fine day in temperate weather; and the moment the frost disappears the covering be entirely removed; as they must by no means be kept too close, which would draw them up weak and tender.

When in blossom, if the weather should prove dry and warm, a few good waterings in the mornings will be beneficial; and when the blossoming plants are advanced a considerable height, if they are then topped, it will promote their podding and coming to perfection.

As to the succeeding crops of the different kinds, all they require is hoeing up the earth to their stems occasionally, and cutting up all weeds when they appear; those designed for support being always sticked as soon as they are half a foot high, or a little more, before they begin to fall down on their sides, providing sticks about four or five feet long, and placing one range to each row principally on the south or most sunny side of the rows, as the plants naturally incline towards the sun, and of course more readily attach themselves to the sticks.

In the culture of the larger kinds, for successional general crops, such as the Marrowfats; Spanish Morattos; &c.; they may be begun sowing in January, the Dwarf Marrowfats first; but the three following months are the most proper for the general crops of all the large kinds; a free exposure in the most open quarters being made use of, drawing drills by line, about an inch and a half or two inches deep, and not less than a yard asunder, and when sticked, four feet, and for the largest sorts four feet and a half to five feet, in single or double rows.

In these cases the seed should be sown thinly along the middle of each drill, drawing the earth evenly over them with the rake, hoe, or feet, covering them equally the depth of the drills, and raking the surface smooth; these sowings being repeated once a fortnight or three weeks; and as the spring advances, once a fortnight, especially from the beginning of April until the end of the following month. Afterwards a few may be sown every ten or twelve days. Late sowings are, however, seldom very fruitful, being often attacked with the mildew; but it is proper to endeavour to have some as long in the season as possible.

When these different crops are come up about three inches high, they should have earth laid up to them on each side of the rows, cutting down all weeds, and repeating the hoeings occasionally according as the growth of weeds may require; and when they are half a foot, or eight or ten inches high, they should have the sticks placed to them; which for these large sorts require sticks six or seven feet high, at least, placing them on the sunny side of the rows, as directed above.

For late crops, any of the sorts, either Hot-

spurs or larger kinds, may be continued sowing all May and until the middle or latter end of June; likewise some of the dwarf sorts at a later period for late production. It may be proper to sow larger portions of Roundvals for the latest crops, on account of their being rather the hardiest to struggle with the summer's heat and drought, and thereby most to be depended on for a late production.

For these crops some of the moistest ground should be chosen; and if the weather should prove very dry and hot, it will be of importance to soak the seed in soft water six or eight hours previous to sowing; or the drills may be well watered after it has been done; either of which will promote their rising expeditiously and more regularly.

It may be observed, in respect to the times of sowing, that it is a good rule, in the different sorts, as soon as one crop appears fairly above ground, to sow another to succeed it of the same kind, so as to have a regular succession of crops following one another in bearing; and if a crop of Marrowfats, &c., and another of Hotspurs, be sown on the same day, the Hotspurs will come into bearing a fortnight the soonest, and the Marrowfats will arrive to a bearing state about the time the others are going out, just in due time to succeed them; which should be attended to in order to have these sorts form a regular succession to each other.

In gathering the crops, both hands ought always to be employed; one to hold the peduncle or footstalk of the fruit, while the other pulls the pods; otherwise the stem or main stalk of the plant, being slender, fragile, and weak, is liable to be broken and destroyed; and the gatherings should always be regularly performed according as the pods fill, never letting them stand to grow old, as they are in the greatest perfection for eating while green, and the plants continue longer in bearing. Crops of peas continue only about a fortnight in full bearing, during which time they furnish a plentiful gathering of pods in their perfection; though in moist showery weather they sometimes continue shooting and flowering three or four weeks; but the produce after the first fortnight is generally inferior both in quantity and quality.

As soon as the crops are past bearing, all the sticks should be taken up and tied in bundles, being set upright in any dry corner for future use.

Culture in Hot-beds.—In order to have green Peas as early in the year as possible, recourse must be had to the assistance of hot-beds; and the proper sorts for this purpose are

the early dwarf kinds, which by this means may be brought into bearing in March, or the following month.

In this intention it is rather the best mode to raise the plants first in the natural ground, by sowing in October or the following month, giving occasional protection from frost; and when one or two inches high, to transplant them into the hot-bed, in January or the beginning of the following month, as by this practice the luxuriant growth of the plants is so checked by the removal, that they shoot more moderately, and thereby blossom and bear sooner and more abundantly.

The sowings should be performed in a warm, dry, south border, or in some similar dry sheltered part of light good earth, in a bed of proper dimensions to have the protection of a frame, &c., in severe weather; sowing them in drills about a foot asunder, in the manner as for the common crops: when they are come up and advanced a little in growth, in a dry day some fine earth should be drawn up to their stems, giving suitable protection in bad weather.

But they may be sown on a moderate hot-bed in December or January, under frames, &c., and when the plants are up, plenty of free air should be admitted every temperate day, and be defended in the nights from frost, snow, and cutting cold; or some may be sown in large pots, and be placed in a hot-house, &c., to bring up the plants quickly for transplanting into the intended hot-bed in January. And they may be sown at once in a hot-bed at the above periods, to remain for bearing: but it is generally more eligible to have the plants previously raised an inch or two in height, either by early sowing in the full ground, or forwarded under frames, or in a hot-bed, &c., as above, for transplanting into a fresh-made hot-bed for bearing.

In either of the above methods of raising the plants for transplanting, when advanced from one to two inches in growth, or little more, they are proper for planting out into the hot-bed to remain for fruiting.

In mild weather, towards the middle or latter end of January, or the beginning of the following month, at furthest, a hot-bed for one or more of the largest three-light frames and glasses should be prepared, which may be either of dung or tan; the latter, where it can be obtained easily at a moderate expense, is considerably the best for this purpose. It should be made two feet and a half or a yard thick, and covered with frames and lights, and when in a moderate temperature the earth be put on for the reception of the plants. Any light good dry earth

may be employed, which should be laid eight or ten inches thick all over the bed; then in a dry mild day the plants may be taken up, raising them with their roots as entire as possible, with what earth will readily hang about the fibres; and after drawing small drills in the earth of the hot-bed, from the back to the front of the frame, a foot and a half asunder, and about an inch deep, the plants should be put in the drills, not more than an inch apart, covering in the earth close to their roots and stems, and giving a very light watering, just to settle the earth; after which the lights should be put on; being careful to raise them occasionally at the upper end to give vent to the steam, &c.: and at first planting out, when in sunny weather, if the plants should flag, a moderate shade should be given in the middle of the day, till the plants have taken root and established themselves.

After this, fresh air must be admitted to the plants daily in fine weather to strengthen them, by tilting the upper end of the lights according to the temperature of the bed and outward air; keeping them close in cold nights, and covering also with mats: occasional moderate waterings should likewise be given in fine days, and, as the plants advance in growth, a little earth be drawn up to their stems once or twice; repeating the moderate refreshments of water frequently as the warm season advances; which may be given more freely when the plants are in bloom. And according to the advanced growth of the plants and increased warmth of the weather, a larger share of fresh air in proportion should be given; and when they are in blossom, if the sun at any time appears too violent for them through the glasses, it is advisable to give a very slight shade an hour or two in the heat of sunny days; likewise, when in full blossom and fruiting, to admit plenty of free air, even sometimes in fine days shoving the glasses entirely off; also still continuing the waterings more abundantly during the time of setting and growth of the pods, and indulging them with the benefit of warm showers of rain. In this way the plants may be brought to bearing in March or April; and by a succession of two crops, in hot-beds made at three or four weeks' interval, and managed as above, a supply be continued till the natural ground crops come into bearing in May.

Where there is the convenience of fruit forcing-houses, hot-walls, &c. a few of the earliest kinds, either previously raised in young plants an inch or two in growth, as in the hot-bed culture, or in default of it, the seed sown; and which being in pots, are placed in these departments; or where there are internal borders of

VOL. II.

earth, some young plants may be placed therein. The internal moderate heat of the above departments, effected either by bark-beds, &c. or fire, or both occasionally, in a requisite degree for forcing the fruit-trees to early production, forwards the malso, so as to have some for gathering in the most early season, in a small proportion.

Culture in the Field.—Where designed to raise crops in order to gather the produce green and young for the supply of markets, November, or rather December, is soon enough to begin the first sowings, especially in open exposed grounds; a dry light soil being chosen for the more forward sowings. As to the sorts, any of the Hotspurs may be used for the forward crops, and for a general crop the Reading Hotspur is excellent; and after that sort, the Masters's and Ormrod's, &c. but of the large kinds the Marrowfat and Spanish Moratto should be chosen for the main crops.

The ground for their reception must be prepared by proper ploughing and harrowing; drills are then to be drawn with a hoe crossways the lands, or with a drill-plough lengthways, two feet at least, or two and a half asunder for the early and three for the larger sorts. As no sticks are intended for these large field crops, having sown the seed, it should be covered in either with the hoe, rake, or harrow; but the hoe or rake will cover them more evenly, and almost as expeditiously. When they come up they must be kept clean from weeds, by broad-hoeing; but this is sometimes performed in fields by horse-hoeing for the sake of expedition; which, having hoes fixed in a sort of plough horizontally, is drawn by a horse between the rows, a man holding the plough-shafts to guide it: but as this can only cut down the weeds, a common drawing hand-hoe must be used to earth up the plants: though this is often disregarded in the field-culture, it however proves very beneficial to the crops.

In these cases the rows should be laid down so as to face the sun as much as possible.

Saving Seed.—In order to save seed, some of each sort should be suffered to stand entirely for that purpose, or some sown of each purposely in different parts, and the whole produce suffered to remain and ripen for seed.

In the latter mode they should be sown in February in some open ground, in rows two or three feet asunder, no sticks being required, and, when the plants come up, be kept clean from weeds by hoeing, the earth being laid up to their stems once or twice. When they are in bloom, they should be examined row by row, to see if there be any degenerate sort, which, when present, must be pulled out; or if any improved

2 II

variety be discovered, to mark it; which is the only method to preserve both the purity of the known sorts, and to procure new varieties. For example, if amongst the Hotspurs any large sorts appear, they should be removed directly; also any Hotspurs, &c., from amongst the large kinds, and different sorts of any of these from each other; and if any new sort discovers itself either by flowering earlier than all the rest, or possessing some other singularity, or noticeable merit for culture, it should be carefully marked, the seed being saved separate, to sow separately for furnishing a proper increase.

According as the seeds of the different sorts ripen in July and August, which is discoverable by the pods changing brown, and the seed becoming a little hard, the haum should be cut or pulled up in dry weather, and exposed in heaps in the sun, turning them every day; and when the seed is become perfectly dry and hard, it may either be threshed out directly, or stacked up in a dry situation till another opportunity: but when threshed, each sort must be kept separate, and when properly cleaned be put up in sacks with the name of each upon them.

PLANE TREE. See PLATANUS.

PLANTAIN TREE. See HELICONIA.

PLANTATION, a large collection of different sorts of trees, planted out either for ornament, or the advantage of the wood as timber, or for both purposes.

Plantations of these kinds not only afford great improvement to estates, but are highly ornamental to the country. They should therefore be more particularly attended to where there are large tracts of poor barren lands that cannot be converted to the more profitable purposes of tillage or grass.

They have also a fine effect in the vicinity of habitations and pleasure-grounds. And in many cases the proprietors of estates, whether of large or moderate sizes, may reap great pleasure and advantage in allotting a part of them to this use, as they give grandeur as well as an air of fertility; and, after the first eight or ten years, in many cases bring in great profit by the gradual thinning of the underwood, besides leaving a sufficiency of standards to attain full growth.

The expense attending the making of Plantations, and the knowing that they must wait several years before the trees have made any considerable progress, or can afford any advantage, often prove an obstacle in attempting the prosecution of the business; but the expense of planting where the plants are raised on the grounds, will not be so great as may be imagined, especially as a small spot of nursery-ground will raise plants enough in three or four years,

to plant a great many acres of land, and the expense of raising and planting, with the loss of time in waiting until the plants attain some growth, will be compensated by the first fall or thinning, in eight or ten years after planting; and the stools which remain shoot up again, in many of the deciduous kinds, and afford a lopping every eight or ten years, exclusively of the due portion of standards left at proper distances, to attain full growth for timber.

In making Plantations, it is necessary to choose such trees as are the best adapted to the nature of the particular soil and situation.

As to the proper sorts of trees or shrubs, most of the deciduous and ever-green kinds may be employed with propriety, and young plants, of from about two or three to five or ten feet in height, always prove more successful than such as are older; for although some, from their being in haste to have Plantations as forward as possible, transplant tall trees, perhaps twelve or fifteen feet high or more, especially for those of the ornamental kind; those of younger growth always take root sooner, and establish themselves more firmly, so as to form considerably the finest Plantations at last, and are of longest duration: for though large trees of from fifteen to twenty feet in height, especially of the deciduous kind, may with care be transplanted, so as to grow, and probably thrive tolerably for some years, yet by not rooting firmly like young plants, they often fail, and after some years standing have hardly made any shoots, and at last gradually dwindle and perish. Large trees should of course never be employed except on particular occasions, where a few may be necessary to form an immediate shade or blind, &c. in some particular place: but for general work, young plants, either raised, or purchased from the nurseries, should be made use of. And for principal Timber Plantations in particular, such plants as are only from about two or three, to five or six feet in height, or eight or ten at most, must be employed, having those of the same Plantation, as nearly of equal growth as possible. See PLANTING.

Where Plantations are intended principally for ornament, as great a variety as possible of the different sorts of hardy trees and shrubs should be employed, and should consist of lofty and middling growing trees, as well as of shrubs. See DECIDUOUS and EVER-GREEN TREES.

In regard to the disposition of the plants, the deciduous and ever-green kinds may be planted in separate compartments, or in mixture, and sometimes the tree-kinds by themselves, some in running varying Plantations,

towards the boundaries of lawns, parks, paddocks, &c. others in avenues, groves, thickets, and clumps, variously disposed in different parts; and sometimes the trees and shrubs together, forming shrubberies, wildernesses, shady walks, and wood-works; placing those of taller growth backward, and the lower in front; bordering the whole with the most beautiful flowering shrubs and showy ever-greens, especially next the principal walks and lawns, varying the form of all the several compartments, sometimes by moderate sweeps and curves outward and inward, of different dimensions, other parts in long easy bends, varied projections and breaks, so as to diversify the scene in imitation of natural Plantations. The proper distances, in planting, may be from five or ten to fifteen or twenty feet: for example, the tall trees designed for continued Plantations may be from ten to fifteen or twenty feet, varying the distance in different parts, according to light and shade, &c. and those in groves, where open may be fifteen or twenty feet distance, and where close ten or twelve; for thickets, five or six feet, or closer in particular places where a very dark shade or thick coverture of wood is required; and in clumps of trees, from five or ten to twenty feet between the trees in each clump, varying the distance occasionally, according to growth, as also the sorts and numbers of trees in each, from two or three, to five, ten, or more. The form of the clumps may sometimes be triangular, at other times quadrangular, pentangular, &c. and some in curves, others in straight lines, to cause the greater variety. And in shrubbery clumps, and wilderness compartments, where the trees and shrubs are employed promiscuously, they may be planted from five to ten feet distance; the taller growths being placed backward eight or ten feet asunder, placing the lower plants gradually forward according to their gradations, to the lowest in front, as above, at four or five feet distance: and if the trees and shrubs of the plantations in general are disposed somewhat in the quincunx way, they appear to the greater advantage, and produce a better effect.

But when large Plantations are to be formed into woods, &c. composed principally of forest and timber trees for profit, particular sorts must be chosen, consisting of deciduous and ever-green trees. Of the first kinds the oak, elm, ash, beech, chesnut, hornbeam, birch, alder, maple, sycamore, plane, poplar, lime, walnut, wild cherry, mountain-ash, larch, willow, hazel, &c. and of the latter sort, the pine, fir, cedar of Lebanon, holly, bay, laurel, yew, ever-green oak, box tree, and some others. See FOREST TREES.

In forming woods, or Plantations of timber-trees, there are two methods chiefly practised: one is by raising the trees from seed at once on the ground where the Plantation is intended to be, especially the deciduous kind, and which is effected by sowing the seed in drills, a yard asunder, the plants remaining where raised, thinning them gradually: the other method is by previously raising the plants in a nursery, till two or three feet high, then transplanting them into the places allotted them, in rows at the above distance, to allow also for gradually thinning. Either of these methods may be practised, as most convenient; but the former, or that of raising the plants where they are to remain, though it may be more expeditious, and at once gets rid of the trouble of transplanting, will require greater attendance for a few years, till the plants have shot up out of the way of weeds; but the trees, from their always remaining where raised, without being disturbed by removal, may probably make a greater progress. The latter method, or that of raising the trees first in a nursery, is rather the most commonly practised, as being thought the least troublesome and expensive, with regard to the attendance at first of the young growth.

The preparation of the ground for the final reception of the seed or plants, is mostly performed by deep ploughing and harrowing, upon such ground as the plough can be employed on; but, where this or other tillage is not practicable, only young plants from the nursery can be used, digging holes, &c. at proper distances, one for the reception of each plant: where, however, the ground can be tilled, it will prove very advantageous by performing it a year before; sowing it with a crop of turnips, or others of a similar kind; and when these come off, ploughing and harrowing the ground again, for the reception either of the seed or plants the ensuing season.

The most proper season for performing this sort of planting, either by seed or plants, is any time in dry mild weather, in the autumn, as from October till February, or later on moist soils. Where large tracts are to be planted, both the seed and plant methods must be pursued all winter, at every favourable opportunity.

The seeds may be put in, in furrows or drills one to two or three inches deep, and three or four feet asunder, scattering them along the middle of the drills, and covering the earth evenly over them, the depth of the drills or furrows; but sometimes the seeds are scattered or sown promiscuously over the general surface, and harrowed into the ground, being well protected from birds and vermin.

Where young plants are employed, they should be planted out in rows, three or four feet asunder, as directed for the seed, and one or two feet apart in the lines; they may be planted either by opening small apertures or holes with the spade for each plant; or, if very small plants, it is sometimes performed by making only a slit or crevice with the spade for each plant; and sometimes by opening or forming small trenches the whole length, then inserting the plants, one person holding whilst another trims in the earth about their roots; some again, in very large tracts, where the situation admits of previous ploughing and harrowing to divide and break the earth into small particles, open furrows with the plough, two or more persons being employed in depositing the trees in the furrow, whilst the plough following immediately with another furrow covers the roots of the plants with the earth, and afterwards treading each row upright. See PLANTING.

The grounds where the Plantations are made should be previously well fenced in all round with a deep ditch, &c. to guard against the encroachments of cattle or other animals.

In the after management, while the Plantations are young, they must have some attendance to destroy weeds, which may be expeditiously executed by hoeing between the rows in dry weather, or occasionally by horse-hoeing; and this care will be needful for two or three years, especially to the seedling plantations, until the trees are advanced out of the reach of weeds; after which no further trouble will be required until the trees are ready for the first fall or thinning, for poles, faggots, &c.

After eight or ten years growth, they are mostly of a proper size to begin the first fall by a moderate thinning, which will serve for poles and faggot-wood, to repay some of the expense of planting, &c. But only part of the Plantation should be lopped the first year; thinning out the weakest and most unpromising growth first; leaving a sufficiency of the most vigorous plants pretty close, to grow up for larger purposes; the year following thinning another part, and so continue an annual thinning-fall till the whole Plantation has been gone over; cutting each fall down near the ground, leaving the stools to shoot out again, especially in the deciduous kinds; and by the time the last fall has been made, the first will have shot up, and be ready to be cut again. So the returns of fallings may be contrived to be every six, seven, eight, or ten years, or more, according to the uses the poles or wood are wanted for: and if larger poles, &c. are wanted, the fall may be only once in fourteen, eighteen, or twenty

years, still, at every fall, being careful to leave enough of the most thriving plants for standards; being left pretty close at first, that they may mutually draw each other up in height; but thinned out every succeeding fall as they increase in bulk and meet, so as to leave a sufficient quantity of the principal trees at proper distances to grow up to timber, which in their turn, as they become fit for the purposes intended, may also be felled according as there may be a demand for them, to the most advantage; having young ones from the stools coming up in proper succession as substitutes, so as the ground may be always occupied as completely as possible.

PLANTING, the operation of inserting plants, seeds, and roots, into the earth, for the purpose of vegetation and future growth.

There are various methods of performing this business in practice for different sorts of plants, seeds, and roots; as Hole Planting; Trench Planting; Trenching-in Planting; Slit or Crevice Planting; Holing-in Planting; Drill Planting; Bedding-in Planting; Furrow Planting; Dibble Planting; Trowel Planting; Planting with balls of earth about the root; Planting in pots, &c. all of which are occasionally used by different practitioners in the several branches of gardening, according as the methods are most proper for different particular sorts of plants.

In the first, or *Hole Planting*, which is the principal method practised with most sorts of trees and shrubs in the full ground, and which is performed by opening with a spade round holes in the earth, at proper distances, for the reception of the plants, each hole should be dug large enough to admit all the roots of the tree or shrub freely every way to their full spread, without touching the sides of the hole, and about one spade deep, or a little more or less, according to the size of the roots and nature of soil, so as, when planted, the uppermost ones may be only about three or four inches below the common surface, or as low as they were before in the ground; though in very humid soils, where the water is apt to stand, the holes should be shallower, so as the uppermost roots may stand full as high as the general level, or higher if necessary, raising the ground about them, especially when performed in winter. When the soil has been thus dug out, the bottoms should be well loosened; the mould in digging out being laid in a heap close to the edge, in order to be ready to fill in again: the holes being thus prepared, and having slightly trimmed the roots, &c. of the trees, one tree or plant must be placed in the middle of the hole, making all its roots spread equally around;

a person holding the plant erect by the stem, while another with his spade casts in the earth about the roots, taking particular care to break all large clods, and trim in some of the finest mould first all round about the roots in general, shaking the tree occasionally, to cause the fine soil to fall in close among all the small root fibres; and where the tree stands too deep, shake it up gently to the proper height; and having filled in the earth to the top of the hole, it should be trodden gently all round, first round the outside to settle the earth close to the extreme roots, continuing the treading gradually towards the stem, to which the mould should be pressed moderately firm, but no-where too hard, only just to settle the earth, and steady the plant in an upright position: then all the remaining earth should be pared in evenly round the tree, to the width of the hole, raising it somewhat above the general level of the ground, to allow for settling, giving it also a gentle treading; and finishing it off a little hollow at top, the better to receive and retain the moisture from rains, and giving occasional waterings in spring and summer, especially for the choicer kinds of trees and shrubs.

After this, in winter, or late in spring, it may be of advantage to the choicer kinds of trees and shrubs, to lay some long mulch at top of all the earth, both to keep out the winter's frost, and prevent the drying winds and drought of spring and summer from penetrating to the roots before the trees are well rooted in their new situations. But some, instead of mulch, use grass turfs turned upside down, especially when planting upon grass ground, or any out-plantations where turfs of grass can be obtained; or in orchards, where the ground is in grass; in which case it may be proper to bank some turfs round the sides and top of each hole, particularly for large trees; which will steady them more effectually, as well as preserve the moisture, if much dry weather should happen the succeeding summer.

In the second, or Trench Planting, which is a method sometimes practised in the nursery, in putting out seedling and other small trees and shrubs in rows; and also used for box edgings, as well as sometimes for small hedge-sets, &c. and always in setting out Asparagus; it is performed by opening a long narrow trench with a spade, making one side upright, then placing the plants against the upright side, and turning the earth in upon their roots. When used for young seedlings, or other small trees, shrubs, &c. the ground is previously trenched or dug over: a line is then set, and with a spade held with its back towards the line, a narrow

trench six or eight inches deep is cut out, turning the earth from the line, making the line side nearly perpendicular: the plants are then inserted in the trench at small distances, close to the upright side, covering in the earth about the roots in planting them: and having planted one row, the earth should be evenly trodden in all the way along, to settle it close, and fix the plants steady, proceeding from row to row in the same manner.

But in planting larger trees in the nursery way by this method, a larger trench will be requisite: sometimes a trench one or two spades wide, with proportionable depth, according as the roots of the trees require, is made; and having opened it all the way along the intended row, the trees are placed along the middle of the trench, filling in some earth to each tree as placed, one person holding it erect whilst another throws in the earth; and having placed one row, trim in all the remaining earth evenly; then treading it closely all the way to fix the plants steady and in a perfectly upright manner.

In the third, or Trenching-in Planting, which is also sometimes practised in light pliable-working ground, for young trees in the nursery way, and sometimes with hedge-sets, &c. being performed by digging along by a line, about one spade in width, and planting at the same time; a line is set; and then having the plants ready, with a spade begun at one end, and standing side-ways to the line, throw out a spit or two of earth; which forming a small aperture, another person being ready with the plants, he directly deposits one in the opening, while the digger proceeds with the digging one spade wide, covering the roots of the plants with the earth of the next spit; and another aperture being thus formed, another plant is placed in: the digger, still proceeding, covers its roots, as before, with the next spit of earth; and so on to the end of the row, placing them at about a foot, or fifteen or eighteen inches asunder, according to the size of the plants. When larger trees with more spreading roots are used, instead of digging the trench only one spade wide, two may probably be requisite for the proper reception of the roots; likewise, in forming the openings for the plants, they should be made large enough to receive the roots freely, digging the earth over them as above. After having planted one row of plants, the earth should be trodden evenly along to settle it to the roots, and steady the plants in an upright position. There is another method of this sort of planting sometimes used for some sorts of roots, such as horse-radish sets, potatoes, &c. which is performed by common

trenching, placing a row of sets in each trench. The horse-radish should be planted in the bottom of the open trench, twelve inches in depth, turning the earth of the next over them; and the potatoe-sets be placed about from four to five or six inches deep, covering them also with the earth of the next trench.

In the fourth mode, or that of Slit Planting, which is performed by making slits or crevices with a spade in the ground, at particular distances, for the reception of small trees and shrub plants, a slit is made for each plant, which is inserted as the work proceeds; and is practised sometimes in the nursery-way, &c., in putting out rows of small plants, suckers, &c., at from about a foot to eighteen inches or two feet high, and which have but small roots: it is also sometimes practised in out grounds, where large tracts of forest-trees are planted, and which are planted out at the above sizes, and in the most expeditious and cheapest method.

It is performed in this manner: a line is set, or a mark made; and then having a quantity of plants ready, they are planted as the work proceeds in making the slits: a man, having a good clean spade, strikes it into the ground with its back close to the line or mark, forming a crevice, taking it out again directly, so as to leave the slit open, giving another stroke at right angles with the first; then the person with the plants inserts one immediately into the second-made crevice, bringing it up close to the first; and directly presses the earth close to the plant with the foot; proceeding in the same manner to insert another plant; and so on till all is finished: which is a very expeditious way of putting out small plants, for large plantations, but should never be employed where other better methods can be used.

A man and a boy in this method will plant out ten or fifteen hundred plants, or more, in a day.

In the fifth, or Holing-in Planting, which is sometimes used in the nursery, in light loose ground: also sometimes with potatoes, &c., in pliable soils; the ground being previously dug or trenched, and a line placed, it is thus performed: a person with a spade takes out a small spit of earth, to form a little aperture, in which another person directly deposits a plant, &c. The digger at the same time taking another spit at a little distance, turns the earth thereof into the first hole over the roots: placing directly another plant in the second opening, the digger covers it with the earth of a third spit, and so on to the end of the row.

In the sixth, or Drill Planting, which is by drawing drills with a hoe from two to four

or five inches deep, for the reception of seeds and roots, and is a convenient method for many sorts of large seeds, such as walnuts, chesnuts, and the like; sometimes also for broad beans, and always for kidney-beans, and peas; likewise for many sorts of bulbous roots, when deposited in beds by themselves; the drills for these should be drawn with a common hoe, two or three inches deep; and for large kinds of bulbous roots, four or five inches in depth, covering in the seeds and roots with the earth, always to the depth of the drills.

In the seventh, or Bedding-in Planting, which is frequently practised for the choicer kinds of flowering bulbs, such as Hyacinths, &c., also for the larger seeds of trees, as acorns, large nuts, and other larger kinds of seeds, stones, and kernels, it is performed by drawing the earth from off the tops of the beds some inches in depth, then planting the seeds or roots, and covering them over with the earth, drawn off for that purpose; for which the ground should be previously dug or trenched over, raked, and formed into beds three or four feet wide, with alleys between; then with a rake or spade trimming the earth evenly from off the top of the bed into the alleys, from two or three to four inches deep for bulbous roots, and for seeds, one or two, according to what they are, and their size; afterwards, for bulbous roots, drawing lines along the surface of the bed, nine inches distance, placing the roots bottom downward, along the lines, six or eight inches apart, thrusting the bottom into the earth: but when for seeds, they may be scattered promiscuously; and having thus planted one bed, then with the spade, let the earth that was drawn off into the alley be spread evenly upon the bed again over the roots or seed, &c., being careful that they are covered all equally the above depth, raking the surface smooth and fine.

This method is in occasional practice, in planting several kinds of the larger prime sorts of bulbous-rooted flowers in beds; and nursery-men also practise it in planting many of their larger seeds, nuts, &c.

And another method of this kind is occasionally practised in some parts, particularly for planting potatoes in low wet grounds, which is by dividing the ground into beds, four feet wide, with alleys two or three feet in width; then digging the beds, and placing the potatoe-sets in three rows along each bed, a foot asunder in the rows: this done, the alleys are dug one spade depth, casting the soil upon the beds over the sets, so as to cover them four or five inches deep: in this way, where the ground is very wet, the alleys drain the moisture from the beds, so

as sometimes to afford great crops. Sometimes, in low moist grounds, that are in grass or sward, the beds are marked out as above, and without digging the ground; placing the potatoe sets immediately upon the sward, then digging the alleys, first turning up the sward, and placing it topsy-turvy upon the bed, so as to be sward to sward over the sets; then finishing by applying more earth from the alleys, to cover in the sets, the proper depth of four or five inches. This, in some counties, is called the lazy-bed method, because the ground is not dug over.

In the eighth, or Furrow Planting, which is by drawing furrows with a plough, and depositing sets or plants in them, covering in also with the plough: it is sometimes practised for planting potatoe-sets in fields, and has been adopted in planting young trees for large tracts of forest-tree plantations, where the cheapest and most expeditious method is required; but this method can be practised only in a light pliable ground, and is performed thus: a furrow being drawn, one or two persons are employed in placing the sets or plants in the furrow, whilst the plough following immediately with another furrow, turns the earth in upon the roots of the plants. This is not a mode to be much advised.

In the ninth, or Dibble Planting, which is the most commodious method for most sorts of fibrous-rooted seedling plants, particularly all the herbaceous tribe; also for slips, off-sets, and cuttings both of the herbaceous and shrubby kinds; likewise for some kinds of seeds and roots, such as broad-beans, potatoe-sets, Jerusalem artichokes, and horse-radish-sets, with numerous sorts of bulbous roots, &c., it is expeditiously performed with a dibble or setting-stick, by making a narrow hole in the earth for each plant, inserting one in each hole always as the work proceeds.

Having a dibble or setting-stick, it is used by thrusting it into the earth in a perpendicular descent, in depth as the particular plants, &c., may require; directly inserting the plant, seed, or set, as each hole is made, closing it immediately by a stroke of the dibble. In setting any kind of plants, slips, cuttings, &c., having long shanks or stems, it is proper to make holes a proportionable depth, to admit them a considerable way in the ground: for example, cabbage-plants, savoys, &c., should be planted down to their leaves; slips and cuttings should be inserted two parts of three, at least, in the ground; being particularly careful in dibbling in all sorts of plants, to close the holes well in every part about the roots, by striking the dibble slantways into the ground, so as to strike

the mould first firmly up to the root and fibres, at the same time bringing it close to the stem. See **DIBBLE**.

In the tenth mode, or Trowel Planting, it is performed with a garden trowel, made hollow like a scoop, and is useful in transplanting many sorts of young fibrous-rooted plants with balls of earth about their roots, so as not to feel their removal.

The trowel is employed both in taking up the plants, and planting them.

In the eleventh, or Planting with Balls of Earth about the Roots, which is the removing a plant with a large ball of earth about its roots, so as by having its roots firmly attached to the surrounding earth, it still, during the operation, continues its growing state, without receiving any, or but very little check from its removal: this is often practised more particularly for the more delicate and choicer kinds of exotics, both trees, shrubs, and herbaceous plants; and occasionally for many of the fibrous-rooted, flowery plants, both annuals, perennials, and biennials, even in their advanced growth and flowering state, when particularly wanted to supply any deficient compartments; though it is not so eligible for bulbous-rooted kinds: likewise, when intended to remove any sort of tree or plant out of the proper planting season, as very late in spring, or in summer, it is proper to transplant it with a good ball of earth, to preserve it more certainly in a state of growth. Some trees and shrubs are more difficult to remove with a ball than most kinds of herbaceous fibrous-rooted plants, though many of the tree and shrub kinds having very fibry roots, also readily rise with good balls.

In transplanting any of the tree and shrub kinds by this method, if they grow in the full ground, the operator must be careful to begin to open a trench with a spade at some distance from and round the stem, perhaps a foot, or two or three, according to the size of the tree and expansion of the roots, digging a sort of trench all round, a spade or two wide, or more if large trees, and in depth below all the roots; all the time having great care not to disturb the ball or mass of earth between the stem and trench, but preserve it as entire as possible. When the whole has been detached, the plant should be removed into the situation for which it is intended, with the whole of its ball about its roots.

When trees or shrubs, with balls to their roots, are intended to be sent to considerable distances, they should be placed singly in osier baskets, in order to preserve the ball; having a basket for each tree; the baskets to be of an upright make, in width and depth in proportion

to the ball, with two handles at top, especially if large, and generally worked rather open at the sides, as sometimes the basket and all is placed in the ground, when the plant cannot be readily removed without danger of breaking the ball of earth about it.

In respect to the method of planting in pots in general, having the pots and mould ready for the reception of the plants, previous to planting them place some pieces of tile, potsherds, or oyster-shell, &c., over each hole at the bottom of the pots, to prevent the holes being clogged and stopped with the earth, and the earth from being washed out with occasional watering; also to prevent the roots of the plants getting out: then having secured the holes, put some earth in the bottom of each pot, from two or three to five or six inches or more in depth, according to the size of the pot, and that of the roots of the plant; then insert the plant in the middle of the pot upon the earth, in an upright position, making its roots, if without a ball of earth, spread equally every way; directly adding a quantity of fine mould about all the roots and fibres, shaking the pot to cause the earth to settle close thereto: at the same time, if the root stand too low, shake it gently up; and, having filled the pot with earth, press it gently all round with the hand, to settle it moderately firm in every part, and to steady the upright posture of the plant, raising the earth however within about half an inch, or less, of the top of the pot, as it will settle lower; for some void space at top is necessary to receive waterings occasionally: as soon as the plant is thus potted, give it directly a moderate watering to settle the earth more effectually close about all the roots, and promote their rooting more expeditiously in the new earth; repeating the waterings both before and after they have taken root, as occasion may require.

In transplanting plants in pots from one pot to another, they may in general be shifted with the whole ball of earth contained in the pot about their roots entire, so as to preserve the plant all along in its growing state, as scarcely to shrink or retard its growth by the operation; for plants growing singly in pots, and of some standing, whose roots and fibres have established themselves firmly in the earth, will readily remove out of the pots with the entire ball in one compact lump, surrounding all the roots and fibres, retaining their growing state by still drawing nourishment from the surrounding ball of earth.

The removing of plants from one pot to another with balls, is in some cases to be avoided; as where a plant appears diseased or in

a bad state of growth, as it is most probable the fault is in the root or earth; therefore, it is eligible to shake the whole entirely out of the earth, in order to examine its roots, and trim off all decayed and other bad parts; then, having a fresh pot, and some entire new compost, replant the tree, &c., therein.

In potting plants from the full ground, or beds of earth, &c., if they have been previously pricked out at certain distances, and have stood long enough to fix their roots firmly, many sorts may be potted with balls, particularly most of the herbaceous, fibrous-rooted kinds, and many of the shrubby tribe, by taking them up carefully with the garden-trowel, or with a spade, as may be convenient, according to the size of the plants; and, if necessary, pare the balls round to fit the pot.

Seedling plants, or those raised from seed-beds, by their growing so close together, rarely admit of potting with balls to their roots; so that when it is intended to pot such, they must be drawn out of the earth with the root as entire as possible, and be potted separately in small pots, shifting them occasionally into larger.

Sometimes in pot-planting, to save room, and for other purposes, several small plants are planted in each pot, especially when designed as nursery-pots, to receive either small seedlings, off-sets, slips, cuttings, &c., just to strike them, and forward them a little at first, either in hot-beds, or for removing them to different situations, such as occasional shade, shelter, &c., and in which some sorts of small slips and cuttings are sometimes planted many together, in one or more wide pots, especially where large supplies of some particular sorts are required, such as myrtle cuttings and pipings of pinks, &c., sometimes to the amount of a hundred or two of these small sets in one capacious pot or wide store pan. The small seedlings, slips, cuttings, off-sets, &c., when they are a little forwarded, or properly rooted, and shoot a little at top, should be all potted off, in proper time, each in a separate pot, especially if plants of any duration; giving them small pots at first, and as they increase in size shifting them into larger ones.

When any large growing plants, such as orange- and lemon-trees, or any other kinds, are become too large for pots, they should be shifted into tubs: these tubs should be made of full-inch thick staves, and adapted to the size of the respective plants; each tub to be well hooped with iron, and furnished with two hooked or bow iron handles at top, by which to move them, either by hand, or, when very large tubs, to receive poles between two men for moving

the plants where wanted; having holes at the bottom of the tubs to discharge the superfluous moisture; placing some stones, &c., to prevent the holes being clogged with the earth; the method of planting and transplanting being the same as in Pot-Planting.

In the twelfth mode, or Planting in Pots, which is practised to all tender exotics, in order for moving them to shelter occasionally, such as all kinds of green-house and hot-house plants; and likewise for many sorts of hardy flowering-plants, for the convenience of moving them occasionally to adorn particular compartments; and for the convenience of moving some curious sorts when in flower to occasional shelter from the sun's rays and excessive rains, in order to preserve their beauty and prolong the time of their bloom; such as the fine auriculas, carnations, &c.

In planting in this way, it is highly requisite carefully to adapt the sizes to the size and nature of the different plants intended to be potted: if small plants, begin first with small pots, one plant only to each pot, especially if to remain; but according as the different plants advance in growth shift them into pots one or two sizes larger, which may be requisite to many sorts once a year, to others once in two or three years, according to circumstances.

Garden-pots for this use are of several regular sizes, from two to sixty in a cast, distinguished at the pot-houses accordingly; as twos, sixes, twelves, sixteens, twenty-fours, thirty-twos, forty-eights, sixties, or sixty-fours, &c., each pot having one or more apertures at bottom to discharge the superfluous moisture. They are sold by the potters at so much per cast, large and small, all of a-price; those of only two in a cast the same as those of sixty; and from two shillings to half a crown or three shillings per cast is the general price. See POT, GARDEN.

Sometimes, instead of baskets, small young trees and other plants with balls, intended to be sent to any distance, are put separately in pots, and when they are to be placed in the full ground, each should be turned out of the pot with the ball entire.

Trees and other plants that have generally grown in pots, where they have been of some standing, have the whole earth by means of the numerous fibres formed into one compact lump, so that it will readily come out entire and firm; or to such as do not so easily quit the pot, a long blade of a knife, or some other thin instrument, may be thrust down between the outside of the ball and pot all round, and it will then readily come out, either in drawing by the stem of the plant, or by striking the edge of the

VOL. II.

pot with something; or, if small plants, you may turn the pot mouth downward, and strike the edge gently against any firm substance. In replanting those potted plants, if the sides of the ball of earth is much matted with the fibres of the root, it is proper to pare off the grossest part, together with a little of the old earth, especially if to be planted in pots again; then put it in a pot a size larger than before, filling up all round with fresh mould, finishing with a moderate watering.

In regard to the proper state and preparation of trees for planting, it may be observed that young trees, both of the fruit and forest kinds, are the most suitable, and succeed best; as from three or four to six or eight feet in height, and from three or four to five or six years old. See FOREST-, DWARF-, and STANDARD-TREES.

In forest-trees, the straightest, most vigorous, and thriving plants of the respective kinds should always be chosen.

In preparing for planting, in taking up the trees out of the nursery, the greatest care is necessary in raising them with as great a spread of roots as possible, which is often ill attended to, especially when large orders of plants are to be drawn in a hurry. The ground about the trees should always be opened with the spade widely round the roots, and deep enough to get to their bottom without hacking and cutting them with the spade, but so as to raise each plant with all its roots as entire as possible. After having taken up the trees out of the nursery, &c., it is also of great moment to have them replanted as soon as possible in the places allotted for them; for, although by properly covering the roots with litter, or, if sent to any considerable distance, by tying them in bundles, and packing them up with plenty of straw about the roots, and afterwards closely matted round, they may be preserved in tolerable good condition a fortnight or longer—yet, where it is possible to plant them the same day, or in a day or two after, before the small fibres are shrunk or dried, it will be of much advantage in the first growth of the trees; but when this cannot be done they should be immediately laid in the ground in a trench.

In preparing for planting, the roots must have an occasional trimming, not however to retrench or reduce any but the maimed and decayed parts; therefore previous to planting examine the root, and cut out all such parts as have been broken or damaged in taking up, and any casual decayed parts or other blemishes, being careful to leave all the sound roots every where entire; leaving also all the small fibres that are fresh and vigorous, only trimming off

such as are become dry and mouldy; suffering all the main roots to remain, mostly at full length, except just to tip off their ends a little on the under side, sloping outward; and reduce any very long stragglers, and shorten long perpendicular tap-roots, more particularly of fruit-trees, to prevent their running down into a bad soil, and to promote their throwing out others horizontally.

And with regard to the preparation of the heads of the trees, the principal care is to trim off the straggling shoots and branches from the stems, leaving the heads for the generality entire, only just retrenching very irregular branches, and shortening any very long stragglers; always suffering the main or leading top shoot to remain at length, particularly in forest-trees, and all others that are to grow to a lofty stature.

Fruit-trees, however, sometimes require a more accurate regulation of the head preparatory to planting, particularly dwarfs for espaliers and walls. If the fruit-tree is taken from the nursery at one year old from the budding and grafting, and with its first shoot from budding and grafting entire, this first shoot must necessarily be shortened or headed down to force out lateral wood below, to furnish the bottom properly; but this heading down is not necessary at the time of planting, but should remain till spring, until the tree has taken fresh root and begins to shoot; for the head remaining greatly promotes the rooting; when in March or the beginning of April, head it down within half a foot, or five or six eyes of the insertion of the bud or graft, and the shoot so headed will throw out, from its remaining lower eyes, several lateral branches the ensuing summer.

If it is two, three, or more years old from the budding and grafting, and the first shoots were headed down in the nursery at the proper time, it is proper to plant it with its whole head entire, only retrenching any irregular branch, or any very luxuriant shoot; or thin out the worst of such as are evidently too close or crowded, leaving however all the regular branches at full length, except just to reduce any very long ramblers.

For new planting trees it is very improper to retrench the branches too severely, and cut all that remains short, as is very often practised, on a supposition of strengthening their roots, which however has often the contrary effect; for the branches and leaves imbibe the refreshing influence of the air, &c., which, being conveyed to the roots, proves nutrimental, and contributes exceedingly towards vegetation, and consequently promotes the rooting afresh more expeditiously and effectually. Besides, by a se-

vere retrenching and a general shortening, of fruit-trees in particular, in most sorts the very parts where fruit would have been soon first produced are cut off, and it will probably cost the tree two or three years growth to furnish new branches equal to those cut away, as well as retard its bearing in proportion. And it often happens by such a general amputation of the branches of all new planted trees at the time of planting, that they, for want of branches to collect vegetative nourishment, either make very little progress in shooting for two or three years after, or sometimes, when they do shoot, throw out a profusion of unnecessary wood from the remaining eyes or buds.

Therefore if young fruit-trees at planting, whether dwarfs or standards, are furnished with five or six or more good regular principal branches, of one, two, or more years growth, it is improper to retrench any part of them, and disfigure the tree, particularly apples, pears, plums, and cherries, which should at all times be but sparingly shortened; and since several good branches being already obtained in the proper parts to give the head its first regular form, they in their turn readily furnish more; and if there is a vacancy in any part, it will be better to endeavour to fill it by stopping some of the young shoots produced the summer after planting, by either pinching or pruning them in May or June the same year to three or four eyes, or cutting them down to that length in the winter or spring following.—Some fruit-trees, however, such as peaches, nectarines, &c., against walls, require most of their young shoots to be shortened annually.

Forest-trees, &c., in their preparation previous to planting, after being drawn out of the nursery, should only have the blemished roots trimmed, and all branches from the lower part of the stem pruned off, cutting the lower ones close, the others to two, three, or four inches, particularly the deciduous kinds, leaving the head always tolerably branchy, and mostly entire; not to trim away all the branches to one leading shoot only, as is often practised, but leave a proportionable share of the upper more erect branches, to form some tolerable head, and only just retrenching the lower stragglers, very long rambling luxuriant, and very irregular growths, to preserve a little regularity; being particularly careful to leave always the top or leading shoot perfectly entire, unless it is decayed, or is very crooked, bending much downwards, &c., in which cases, if any straight shoot is conveniently situated, the crooked part may be retrenched down to the straight shoot, which leave entire to run up in height, as with-

out a leader a tree can never aspire to any considerable stature; for the leader, by its annual erect shoot, gradually increases the length of the stem, and, as it advances, sends out a supply of laterals to furnish the head, branching and spreading.

In planting tall trees, where it is designed to form shade, shelter, or blind as soon as possible, very little reduction of the branches of the head should be suffered, only to reduce any very irregular growers.

In removing pretty large trees of any sort with considerable heads, especially when very spreading or crowded, it may be proper to reduce the whole regularly in some proportion to the root, that the winds may not have too much power to incommode it after planting; in which cases it may be necessary to retrench or reduce some of the most extensive lower branches, and thin out some where much crowded, reducing others down to some convenient lateral branch they may support, so as each reduced branch may, notwithstanding its reduction, terminate in a leader, having its top entire, not to exhibit naked ends of branches, standing up like stumps.

In respect to the preparation for planting of all the shrub kind, only just trim the straggling under branches and shoots from the lower part of the stem, retrenching any luxuriant of the heads that seem to shoot away very irregularly and vigorously at the expense of the neighbouring branches, and reducing long rambles, &c., just to preserve a little regularity.

All new planted tall trees should be staked as soon as planted, in order to support them steady every where till they are well rooted and have somewhat established their roots, that winds may not overset, or otherwise incommode them; particularly all trees of six, eight, or ten feet high, and upwards; one tall stout stake being placed to each tree, or more, if the trees are of large size, sharpening the lower ends, and driving them firmly into the ground near the stem; or if larger trees, place it slantways, at a little distance, so as its top reach the upper part of the stem, on the opposite side to that most exposed to the winds, in which it will have the greatest effect; but large trees with full heads, should generally have very tall strong stakes, three to each tree, placed triangular-ways, in an oblique or slanting direction, afterwards binding the stems of the trees firmly to the stakes, previously wrapping some soft substance, such as hay-bands, &c., round them, at the part where it is to be fastened to the stakes, in order to save the bark from being rubbed off against the stakes by the motion of the winds, which is more par-

ticularly necessary to tall plants that are much exposed.

Large trees of considerable stature, with full heads, are often supported with ropes suspended from the top of the stem three different ways, straining them tight, and the end of each rope staked securely down to the ground; so that whatsoever way the wind blows the ropes stay the tree still in its upright position.

Such new planted trees as are exposed to cattle should each be well fortified all round the stem with thorn bushes.

The general season of planting, for all sorts of trees, is autumn and spring, as from the beginning of the decay of the leaf, in October, until December, for the former; though evergreens may be begun to be transplanted towards the middle or latter end of September and continued till December. And for the spring planting, February and March is the principal time, but may be continued occasionally until April; and several sorts of tender young evergreens succeed best when planted the beginning of that month, or later. Much, however, in this business, must depend on the soil and state of the weather.

In preparing to plant herbaceous fibrous-rooted plants, care is to be had to remove them with good roots; young seedlings, &c., especially require particular care in drawing them with proper roots. When they are to be taken all clean up, they may be readily loosened and raised out of the earth with some instrument with all their fibres entire; but when they are only to be thinned, they do not admit of this, as it would disturb the remaining plants, so must be drawn out by hand carefully, with as much root as possible.

Many sorts of fibrous-rooted plants, however, are so hardy, and apt to grow, that if taken up almost any how, with a little root, they will strike: it is nevertheless advisable to use care in drawing all sorts for planting with tolerable roots, as they will in proportion make more progress in their future growth. And as to any trimming preparatory to planting, very little is wanted, only in some sorts, just shortening very long naked spindly roots, and trimming any straggling fibres; though in numbers of plants of this tribe hardly any trimming at all is required, either in root or top.

PLATANUS, a genus containing plants of the exotic deciduous tree kind.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that the male flowers are compound, forming a globular ament. The

calyx is a few small jags. The corolla scarcely apparent: the stamina have oblong filaments, thicker at top, coloured: anthers four-cornered, growing round the filament at the lower part—female flowers forming a globe, numerous, on the same tree: the calyx has many very small scales: the corolla has many petals, concave, oblong, club-shaped: the pistillum many awl-shaped germs, ending in awl-shaped styles; with a recurved stigma: there is no pericarpium: fruits many, collected into a globe: the seed roundish, placed on a bristle-shaped peduncle, and terminated by the awl-shaped style; with a capillary pappus adhering to the base of the seed.

The species are: 1. *P. orientalis*, Oriental Plane Tree; 2. *P. occidentalis*, American Plane Tree.

The first has the stem tall, erect, and covered with a smooth bark, which annually falls off; it sends out many side branches, which are generally a little crooked at their joints; the bark of the young branches is of a dark brown, inclining to a purple colour; the leaves are placed alternate, on foot-stalks an inch and a half long; the leaves themselves are seven inches long and eight broad, deeply cut into five segments, and the two outer are slightly cut again into two more; these segments have many acute indentures on their borders, and have each a strong midrib, with many lateral veins running to the sides; the upper side of the leaves is of a deep green, and the under side pale. The flowers come out upon long peduncles hanging downward, each sustaining five or six round balls of flowers; the upper, which are the largest, are more than four inches in circumference; these sit very close to the peduncle. The flowers are so small as scarcely to be distinguished without glasses; they come out a little before the leaves, which is in the beginning of June; and in warm summers the seeds will ripen late in autumn, and if left upon the trees will remain till spring, when the balls fall to pieces, and the bristly down which surrounds the seeds helps to transport them to a great distance with the wind. It is a native of Asia.

There are two varieties, as the Maple-leaved, which has not its leaves so deeply cut as those of the eastern plane: they are divided into five segments, pretty deep, but are not lobed, like those of the occidental plane. The petioles are much longer than in either of the species, and the upper surface of the leaves is rougher, so that they might be taken for different sorts, if it was not known that they rose from the same seeds.

The Spanish Plane, which has larger leaves

than either of the sorts, and are more divided than those of the occidental, but not so much as those of the oriental. Some of the leaves are cut into five, and others into three lobes only; these are sharply indented on the edges, and are of a light green; the footstalks are short, and covered with a short down. This is by some called the Middle Plane Tree, from the leaves being of a shape between the two species.

These are highly ornamental trees for pleasure-grounds.

The second species grows to a large size, the stem very straight, and of equal girth most part of the length; the bark is smooth, and annually falls off like that of the former; the branches extend wide on every side; the young ones have a brownish bark, but the old ones a gray bark; the footstalks of the leaves are three inches long; the leaves are seven inches long, and ten broad; they are cut into three lobes or angles, and have several acute indentures on their borders, with three longitudinal midribs, and many strong lateral veins. The leaves are of a light green on their upper side and paler on their under. The flowers grow in round balls like the former, but are smaller. The leaves and flowers come out at the same time with the former, and the seeds ripen in autumn. It is a native of most parts of America.

This is also an ornamental tree in the same situations.

Culture.—These plants may be increased by seed, layers, and cuttings; but principally in the two last methods.

The best season for sowing the seeds is autumn, if they can be procured, otherwise in the spring; upon a somewhat lightish, mellow soil: the ground having been dug and raked, it should be formed into four-feet wide beds, and the seeds then scattered evenly on the surface, and raked in, or with the back of a rake the earth be previously trimmed off the surface near half an inch deep into the alleys; then sowing the seed, and directly, with the rake turned the proper way, drawing the earth evenly over the seeds, and trimming the surface smooth, when many of the plants will rise in spring, but probably not generally till the spring following. When they are one or two years old, they should be planted out in nursery-rows, two feet asunder, and about half that distance in the lines; to remain till of a proper size for being finally set out.

In the layer method, some stout plants must be planted for stools, which in a year after must be headed down near the bottom, that they may throw out many shoots near the ground convenient for laying; which, in the autumn after

they are produced, should be laid down by slit-laying; and by the autumn after, they will be well rooted, and form plants two or three feet high, which may be separated, and planted in nursery-rows, as the seedlings. They succeed very readily in this way.

Most of the sorts take tolerably by cuttings of the strong young shoots; but the latter more freely than the former kinds. The most proper season for planting them is the autumn, as soon as the leaf falls, or occasionally in the spring; choosing a moist soil for the purpose, when many of the cuttings will grow, and make tolerable plants by the autumn following.

These last two methods are the only ones in order to continue the distinct varieties effectually.

They have a very ornamental effect in all sorts of plantations, from their large growth and the great size of their leaves.

PLEASURE-GROUND, any ornamented ground round a residence. It comprehends all the ornamental compartments or divisions of ground and plantation; such as lawns, plantations of trees and shrubs, flower compartments, walks, pieces of water, &c., whether situated wholly within the space generally considered as pleasure-ground, or extended over ha-ha's, or by other communications, to the adjacent fields, parks, paddocks, or out-grounds.

In designs for pleasure-grounds, modern improvements reject all formal works, such as long straight walks, regular intersections, square grass plots, corresponding parterres, quadrangular and angular spaces, inclosed with high clipped hedges, &c., as well as all other uniformities; instead of which, open spaces of grass ground of varied forms and dimensions, and winding walks, all bounded with plantations of trees, shrubs, and flowers, in various clumps and other distributions, are exhibited in a variety of imitative rural forms, as curves, projections, openings, and closings, in imitation of a natural assemblage, having all the various plantations open to the walks and lawns. A spacious open lawn of grass ground being generally first exhibited immediately in the front of the mansion, or main habitation, sometimes widely extended in open space on both sides to admit of greater prospect, &c., and sometimes more contracted towards the habitation, widening gradually outward, and having each side embellished with plantations of shrubbery, groves, thickets, &c., in clumps, and other parts, in sweeps, curves, and projections, towards the lawn, &c., with breaks or openings of grass spaces at intervals, between the plantations; and serpentine gravel-walks winding under the shade of the trees: extended plantations

being also carried round next the outer boundary of the ground, in various openings and closings, having also gravel-walks winding through them, for shady and private walking; and in the interior divisions of the ground serpentine winding walks exhibited, and elegant grass opens, arranging various ways, all bordered with shrub-beries, and other tree and shrub plantations, flower compartments, &c., disposed in a variety of different rural forms and dimensions, in easy bendings, concaves, projections, and straight ranges, occasionally; with intervening breaks or openings of grass ground, between the compartments of plantations, &c., both to promote rural diversity, and for communication and prospect to the different divisions; all the plantations being so variously arranged, as gradually to discover new scenes, each furnishing fresh variety, both in the form of the design in different parts, as well as in the disposition of the various trees, shrubs, and flowers, and other ornaments and diversities.

So that in these designs, according to modern gardening, a tract of ground of any extent may have the prospect varied and diversified exceedingly, in a beautiful representation of art and nature, so that in passing from one compartment to another, new varieties present themselves in the most agreeable manner; and even if the figure of the ground be irregular, and its surface has many inequalities, in risings and fallings, and other irregularities, the whole may be improved without any great trouble of squaring and levelling, as, by humouring the natural form, even the very irregularities may be made to conceal their natural deformities, and carry along with them an air of diversity and novelty. In these rural works, however, we should not entirely abolish all appearance of art and uniformity; for these, when properly applied, give an additional beauty and peculiar grace to all natural productions, and sets nature in the fairest and most advantageous point of view. One principal point in laying out a pleasure-ground, is for the designer to take particular care that the whole extent of his ground be not taken in at one view, as where the contrary is the case there is a tameness and want of proper effect produced.

It is impossible to give any directions for planning a pleasure-ground; as the plan may be varied exceedingly, according to the natural figure, position, and situation of the land, and taste of the designer.

In respect to the situation, it must be immediately contiguous to the main house, whether high or low situated: however, a somewhat elevated situation, or the side or summit of some moderate rising ground, is always the most

eligible on which to erect the chief habitation, arranging the pleasure-ground accordingly; such an exposure being the most desirable, both for the beauty of the prospect and healthfulness of the air; a low level situation neither affording a due prospect of the ground, or the adjacent country, besides being liable to unwholesome dampness, and sometimes inundation in winter: there are, however, many level situations, forming plains or flats, that possess great advantages both of soil and prospect, and the beauties of water without too much moisture; there are also sometimes large tracts of ground, consisting both of low and high situations, as level plains, hollows, eminences, declivities, and other inequalities, which may be so improved as to make a most desirable pleasure-ground, as the scene may be varied in the most beautiful manner imaginable; but as the choice of situation and scope of ground is not always attainable, every one must regulate his plan in the most commodious manner possible, agreeable to the nature of the particular situation, extent of ground, and plan which has been adopted.

The extent of pleasure-grounds may be various, according to that of the estate or premises, and other circumstances, as from a quarter or half an acre to thirty or forty or more.

The ground for this purpose should previously be well fenced in, by a wall, paling, hedge, or parts of each sort, and in some parts a fosse or ha-ha, where it may be necessary to extend the prospect, either at the termination of a lawn, walk, or avenue; and the close fences should generally be concealed withinside, particularly the wall and paling fences, by a range of close plantation, unless where the wall may be wanted for the culture of wall-fruit. But sometimes, when the pleasure-ground adjoins to a fine park, paddock, or other agreeable prospect, the boundary fence on that side is often either a low hedge, or a ha-ha; but many prefer the latter, especially at the termination of any spacious open, both to extend the prospect more effectually, and give the ground an air of greater extent than it really has, at a distance; the ha-ha being sunk, nothing like a fence appears, so that the adjacent park, fields, &c., appear to be connected with the grounds.

The arrangement of the several divisions, both internal and external, must be wholly regulated by the nature and extent of the ground.

And in whatever mode such grounds are laid out, the whole of the different quarters, walks, and other parts, should be kept in an exact and neat order.

PLIANT MEALY TREE. See **VIBURNUM**.

PLINIA, a genus comprising a plant of the exotic shrubby kind for the stove.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Rosaceæ*.

The characters are: that the calyx is a one-leaved perianth, five- or four-parted: segments acute, flat, small: the corolla five- or four-petalled: petals ovate, concave: the stamens have numerous capillary filaments, the length of the corolla: anthers small: the pistillum is a superior, small germ: style awl-shaped, longer than the stamens: stigma simple: the pericarpium is a very large drupe, globular, grooved: the seed single, very large, globular, smooth.

The species is *P. pedunculata*, Red-fruited *Plinia*, or *Myrtle*.

It has the leaves opposite, petioled, simple, even, like those of myrtle, ovate: the flowers are peduncled, the length of the leaves, subumbelled: the calycine leaflets four, ovate, concave, spreading, coloured, reflex: the petals, four or eight, obovate, sessile, twice as long as the calyx: the filaments very many, capillary, the length of the petals, inserted into the receptacle: anthers roundish: germ inferior, roundish angular: the style filiform, the length of the stamens: the stigma simple: the berry roundish, the size of a plum, with eight swellings, one-celled, umbilicated, with a four-toothed calyx, red and sapid: seed single, sub-globular. It is a native of Brasil, flowering in January and February.

Culture.—It is increased by the seeds, which should be procured from abroad, and which should be sown in pots, filled with rich mould, plunging them in a bark hot-bed, when they appear in the same season. They may also be increased by planting cuttings of the young shoots, in the later spring and summer months, in pots filled with good earth, covering them with hand- or bell-glasses, and watering them occasionally. They may be so rooted as to be fit for removing into separate pots the same year.

It is highly ornamental in stove-collections, from its flowering in the winter season.

PLUM. See **PRUNUS**.

PLUM, MAIDEN. See **CAMOCCLADIA**.

PLUMBAGO, a genus containing plants of the herbaceous flowering perennial kinds.

It belong to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Plumbagines*.

The characters are: that the calyx is a one-leaved perianth, ovate-oblong, tubular, five-cornered, rugged, with a five-toothed mouth, permanent: the corolla one-petalled, funnel-form: tube cylindrical, narrower at top, longer

than the calyx: border five-cleft, from erect-spreading, with ovate segments: nectary of five very small acuminate valves in the bottom of the corolla, inclosing the germ: the stamina have five, awl-shaped filaments, free within the tube of the corolla, placed on the valves of the nectary: anthers small, oblong, versatile: the pistillum is an ovate germ, very small: style simple, the length of the tube: stigma five-cleft, slender: the pericarpium is an oblong capsule, five-cornered, terminated by the permanent style, one-celled, five-valved, clothed with the calyx: the seed single, oblong, fastened to a thread, pendulous.

The species cultivated are: 1. *P. europæa*, European Leadwort; 2. *P. zeylanica*, Ceylon Leadwort; 3. *P. rosea*, Rose-coloured Leadwort; 4. *P. scandens*, Climbing Leadwort.

The first has a perennial root, striking deep into the ground: the stalks many, slender, three feet and a half high, and channelled: the leaves three inches long and two broad, smooth, entire, of a grayish colour. The upper part of the stalks send out many slender side branches, which have small leaves on them: these and also the principal stalks are terminated by tufts of either blue or white flowers, which are small and succeeded by rough hairy seeds. It is a native of the South of Europe and Africa, flowering here in October.

The second species is a perennial plant, with a strong fibrous root, from which arise many slender stalks, growing near four feet high: the leaves about three inches long, and an inch and half broad near their base, ending in acute points; they are alternate, and on short foot-stalks: the upper part of the stalks divides into small branches, having smaller leaves on them, and terminating in spikes of flowers: seeds covered with the prickly calyx: the upper part of the stalks and the calyx of the flowers are very glutinous, sticking to the fingers, and entangling small flies that settle on them. It is a native of the East Indies and of the Society Isles, flowering from April to September.

The third is a shrubby plant, which frequently grows to the height of four or five feet, and is perpetually putting forth flowering spikes; these continue a long time, and hence, with proper management, may be kept in flower during most part of the year. The calyx has capitate glutinous hairs scattered over it: the filaments are dilated at the base and arched: the capsule superior, clothed with the permanent calyx, ovate-oblong, ending in the subulate-setaceous style, obscurely five-cornered: the seed oblong, acuminate above, of a dark blood-red or ferruginous colour, suspended by a filiform umbilical

chord, springing from the base of the capsule. It is a native of the East Indies.

The fourth species has a suffrutescent stem, scandent, sometimes decumbent, loose, flexuose, branched, round, striated, smooth: the leaves are alternate, ovate-lanceolate, acuminate, nerved, spreading, entire, smooth on both sides: two smaller leaflets at the base of the middle, and two above it: the petioles very short, compressed, channelled, half embracing, membranaceous at the edge, with a red spot at the base underneath: the flowers terminating, subpanicked, commonly in spikes, sessile, scattered, approximating: the leaflets sessile under the flowers; the calyx inferior, bellying in the middle and towards the base, five-grooved, with glanduliferous hairs: the border of the corolla five-parted: parts roundish, emarginate, with a very short point in the middle: the nectarice roundish, yellow, round the germ, inserted into the bottom of the calyx: the filaments thickened, approximating, awl-shaped: anthers placed on the top of the filaments, blue: style the length of the stamens: seed coated, as it were included in a capsule, and covered with the permanent calyx. It is a native of South America and Jamaica, flowering in July and August.

Culture.—The first sort is increased by parting the roots in the autumn, when the stems decay, and planting them in a dry soil. They should afterwards be kept clean from weeds, and have proper support.

The three other sorts should be raised from seeds, which should be sown in pots, in the spring, and plunged in hot-beds. They likewise may sometimes be raised by planting slips and cuttings in pots, and plunging them in the same sorts of hot-beds.

These are all ornamental flowering plants; the first in the pleasure-grounds, and the others in pots among hot-house collections.

PLUMERIA, a genus containing plants of the succulent flowering exotic kind, for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-parted perianth, blunt, very small: the corolla one-petalled, funnel-form: tube long, widening gradually: border five-parted, from erect-spreading; segments ovate-oblong, oblique: the stamina have five, awl-shaped filaments, from the middle of the tube: anthers converging: the pistillum is an oblong, bifid germ: styles scarcely any: stigma double, acuminate: the pericarpium consists of two foliicles, long, acuminate, ventricose, bent downwards, nodding, one-celled, one-valved: the seeds numerous;

oblong, inserted into a larger ovate membrane at the base, imbricate.

The species are: 1. *P. rubra*, Red Plumeria, or Jasmine; 2. *P. alba*, White Plumeria; 3. *P. obtusa*, Blunt-leaved Plumeria; 4. *P. pudica*, Close-flowered Plumeria.

The first rises to the height of eighteen or twenty feet: the stalks are covered with a dark green bark, having marks where the leaves are fallen off; they are succulent, abound with a milky juice, and within are somewhat woody: towards the top they put out a few thick succulent branches, with leaves at their ends of a light-green colour, full of milky juice, having a large midrib and many transverse veins: at the ends of the branches also come out the flowers in clusters; shaped like those of the Oleander or Rose bay, of a pale-red colour, and having an agreeable odour. They are produced in this climate in July and August.

The second species has the habit of the first, but is not much branched, and rarely exceeds fifteen feet in height; it abounds, like that, in a milky juice: the flowers are in spikes, white with a yellowish eye, and diffuse a very sweet odour to a considerable distance. It is a native of Campeachy.

The third produces small white flowers resembling those of the second: the leaves are oval-lanceolate, and the peduncles branched. Some describe it as a thick tree, exceeding the middle size, with an ash-coloured, smooth, milky bark, a juicy brittle wood, and spreading, thick, twisted branches: the leaves quite entire, large, flat, smooth, scattered, with many transverse ribs: the flowers terminating, in compound spreading upright racemes. It is a native of the West Indies.

The fourth species is an upright milky shrub, five feet in height, of the same habit with the others: the leaves oblong, flat, veined: the flowers numerous, yellowish, the border continuing erect and shut, even after they drop; being rolled up like the flowers of Hibiscus: they succeed each other continually for two months together; and have an odour much more agreeable than that of the preceding species, or even of any other known flower. It is a native of South America.

Culture.—These plants are capable of being increased by seeds and cuttings of the young branches.

The seeds should be procured from the native situation of the plants, and be sown in pots, filled with a light sandy compost, plunging them in a hot-bed, covered by glasses, or the bark-bed in the stove, when they readily vegetate; and when the plants have attained a few

inches in growth, they should be removed into separate pots, of a small size, which must be plunged in beds of the same kind as the above.

The cuttings should be made from the young branches, and after being laid in the stove or some other dry situation, to dispel their succulence, and heal over the wounds, be planted out during the summer months, in pots, filled with light dry mould, plunging them in the bark-bed of the stove, giving occasional shade and very slight waterings, till they have stricken fresh root, and when they have become well rooted, they may be removed into separate pots, being managed as other stove exotics.

They afford much ornament and variety among collections of stove plants; especially the red sort; and when set out with other potted plants in the summer, have a delightful fragrance.

POISON-ASH. See RHUS.

POISON-NUT. See STRYCHNOS.

POISON-OAK. See RHUS.

POLEMONIUM, a genus containing plants of the fibrous-rooted, herbaceous flowering perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a one-leaved perianth, half-five-cleft, inferior, goblet-shaped, acute, permanent: the corolla one-petalled, wheel-shaped: tube shorter than the calyx, closed by five valves placed at the top: border five-parted, wide, flat: segments roundish, blunt: the stamina have five filaments, inserted into the valves of the tube, filiform, shorter than the corolla, inclining: anthers roundish, incumbent: the pistillum is an ovate, acute, superior germ: style filiform, the length of the corolla: stigma trifid, revolute: the pericarpium is a three-cornered capsule, ovate, three-celled, three-valved, opening three ways at top, covered: partitions contrary to the valves: the seeds very many, irregular, sharpish.

The species are: 1. *P. coeruleum*, Common Polemonium; 2. *P. reptans*, Creeping Polemonium, or Greek Valerian.

The first has a perennial, fibrous root: the herb smooth: the stems upright, rising to the height of eighteen or twenty inches, seldom more, leafy, panicled: the leaves alternate, unequally pinnate, many-paired; leaflets elliptic-lanceolate, quite entire: the corolla between bell-shaped and wheel-shaped, blue: the calyx bell-shaped, half-five-cleft: the filaments dilated at the base and membranaceous: capsule clothed with the calyx, ovate-globular, absolutely three-grooved, thin, subpellucid: seeds

six in each cell, in a double row, fastened to the inner angle of the cell, variously angular, eroded on the surface, of a dark rust colour. It is a native of Asia, flowering in May.

There are varieties with white flowers, with variegated flowers, and with variegated leaves.

The second species has creeping roots, by which it multiplies very fast. The leaves have seldom more than three or four pairs of leaflets, which stand at a much greater distance from each other than those of the common sort, and are of a darker green. The stalks rise nine or ten inches high, sending out branches their whole length. The flowers are produced in loose bunches, on pretty long peduncles; they are smaller than those of the common sort, and of a lighter blue colour. It is a native of America.

Culture.—These plants may be increased by seeds and parting the roots.

The seeds should be sown in the spring, upon a bed of light earth, and when the plants are pretty strong they should be pricked out into another bed of the same earth, four or five inches asunder, shading and watering them until they have taken new root; keeping them clear from weeds until the beginning of the autumn, and then transplanting them into the borders of the pleasure-ground. The plants are not of long duration; but by taking them up in autumn and parting their roots they may be continued some years: but the seedling plants flower stronger than those from offsets.

The varieties can only be continued by parting the roots at the above season. They should have a fresh light soil, which is not too rich, as the roots will be apt to rot in winter, and the stripes on the leaves to go off.

The second sort may be increased by seeds or offsets in the same manner, and is equally hardy, but much less beautiful.

They afford ornament among flowery plants in the borders and other parts.

POLEY-MOUNTAIN. See **TEUCRIUM**.

POLYANTHES, a genus containing plants of the bulbo-tuberous rooted herbaceous flowering perennial exotic kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla one-petalled, funnel-form: tube curved inwards, oblong: border patulous, with six ovate segments: the stamina have six filaments, thick, blunt, at the jaws of the corolla: anthers linear, longer than the filaments: the pistillum is a roundish germ, at the bottom of the corolla: style filiform, mostly shorter than the corolla: stigma trifid, thickish, melliferous:

VOL. II.

the pericarpium is a roundish capsule, obtusely three-cornered, at the base involved in the corolla, three-celled, three-valved: the seeds very many, flat, incumbent, in a double row, semi-orbiculate.

The species is *P. tuberosa*, Tuberoze, or Indian Tuberous Hyacinth.

It has an oblong bulb-like tuberous root, which is white, sending forth a few long but very narrow leaves, and an upright, firm, straight stem, of considerable length, which is terminated by a long spike of large white flowers, placed in an alternate manner. It is a native of India.

There are varieties with a double flower, with striped leaves, and with a smaller flower. The last is frequent in the south of France, whence the roots have been often brought here early in the spring, before those roots have arrived from Italy which are annually imported; the stalks of it are weaker, and do not rise so high, and the flowers are smaller than those of the common sort, but in other respects it is the same.

The Genoese are the people who cultivate this plant to furnish all the other countries where the roots cannot be propagated without great trouble and care, and thence the roots are annually sent to this and other countries. In most parts of Italy, Sicily, and Spain, the roots thrive and propagate without care where they are once planted.

It has been long cultivated in this country for the exceeding beauty and fragrancy of its flowers.

Culture.—These plants are chiefly increased by off-sets from the roots.

The blowing roots that are annually brought from abroad, for sale, are mostly furnished with off-sets, which should be separated previously to planting; those also raised here in the garden are frequently furnished with off-sets, fit for separation in autumn, when the leaves decay. They should be preserved in sand during winter, in a dry sheltered place; and in the beginning of the spring, as March, be planted out either in a bed of light dry earth in the full ground, or, to forward them as much as possible, in a moderate hot-bed, sheltering them in cold weather either by a frame and lights or with mats on arched hoops, letting them enjoy the full air in mild weather, giving also plenty of water in dry seasons during the time of their growth in spring and summer.

They should remain in this situation till their leaves decay, in autumn; then they should be taken up, cleaned from earth, and laid in a box of dry sand, to preserve them till spring following, at which time such roots as are

2 K

large enough to blow may be planted and managed as directed below, and the smaller roots planted again in a nursery-bed, to have another year's growth; afterwards planting them out for flowering.

The roots of these plants are mostly sold at the rate of about twelve or fifteen shillings per hundred, care being taken always to procure as large roots as possible, as on this depends the success of having a complete blow.

In order to blow them in a perfect manner, they require artificial heat in this climate, and should be planted in pots, and plunged in a hot-bed, under a deep frame, furnished with glass lights; or placed in a hot-house, where they may be blowed to the greatest perfection, with the least trouble.

The principal season for planting them is as above; but in order to continue a long succession of the bloom it is proper to make two or three different plantings, at the interval of about a month.

Where dung hot-beds are employed, six inches depth of earth, or old tan, should be laid, in which to plunge the pots; but if bark or tan be used, no earth is necessary, as the pots may be plunged immediately into the bark. Having the hot-beds ready, and the roots provided, and some proper sized pots, twenty-fours, one for each root, fill the pots with light rich earth; and, after having divested the roots of all loose outer skins, and all off-sets, plant one in each pot, in depth, so as the top of the root be about an inch below the surface of the earth, plunging all the pots in the hot-bed close together, or so that the bed may contain the number required; and as soon as they are all thus placed, put on the lights of the frame.

In the hot-house method, the pots of roots as above should be plunged to their rims in the bark-bed, or placed in the front part of the house; but the former is the better method.

They afterwards require to have a portion of fresh air daily admitted, by tilting the upper ends of the lights, keeping them close down on nights; also moderate waterings, which however should be applied very sparingly, till the roots begin to shoot, when repeat them moderately as occasion may require, taking care when the shoot begins to advance to admit fresh air more freely, in proportion, to strengthen the stems, according as they advance in height; and when they have risen near the glasses, it is proper to deepen the frame, either by the addition of another at top, or by raising it at bottom six or eight inches, in order to give the stems sufficient room to shoot to their full stature, repeating this once or twice, as the

growth of the plants renders it necessary, still assisting them with plenty of water, and a large portion of fresh air daily, either by raising one end of the lights as above; or when the plants are advanced some tolerable height, and in the warm season, the lights may be taken away entirely, occasionally, in fine mild days, which will strengthen and inure them gradually to the full air: but always draw on the lights again towards the evening, or at the approach of a sharp air, cold blasts, or heavy rains; but as the summer approaches begin to expose them fully, only giving occasional shelter in cold nights or very wet weather, either by the glasses, or mats supported on hoop arches, till they begin to flower, which will be about the middle or latter end of June, or beginning of July; when the plants in their pots may be removed where wanted; either to adorn any of the garden compartments, or any apartment of the house, a tall straight stake being placed to each plant, to fasten the stem to for support.

The plants must still be duly supplied with water all the time of their bloom, as every other day, or oftener, in very hot dry weather.

Sometimes roots when planted in May in the full ground, will shoot tolerably strong, and produce flowers in autumn.

They are all highly ornamental, but especially the single and double sorts, among other tender potted plants. The dwarf and variegated sorts also afford a fine variety.

POLYANTHUS. See PRIMULA.

POLYANTHUS-NARCISSUS. See NARCISSUS.

POLYGALA, a genus containing plants of the woody, under shrubby, and herbaceous perennial kinds.

It belongs to the class and order *Diadelphia Octandria*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a five-leaved, small perianth: leaflets ovate, acute: two below the corolla, one above that, and two in the middle, subovate, flat, very large, coloured, (the wings) permanent: the corolla sub-papilionaceous: standard almost cylindrical, tubular, short, with a small reflex mouth, bifid: wings; keel concave, compressed, ventricose towards the tip: appendix of the keel, in most of the species two three-parted pencil-shaped bodies, fastened to the keel towards the tip: the stamina have diadelphous filaments (eight connected) inclosed within the keel: anthers eight, simple: the pistillum is an oblong germ: style simple, erect: stigma terminating, thickish, bifid: the pericarpium is an obcordate capsule, compressed with an acute margin, two-

celled, two-valved: partition contrary to the valves; opening at each margin: the seeds solitary, ovate (with a glandular umbilicus).

The species cultivated are: 1. *P. myrtifolia*, Myrtle-leaved Milk-wort; 2. *P. Chamæbuxus*, Box-leaved Milk-wort.

The first has a shrubby stem, covered with a smooth brown bark, rising four or five feet high, and sending out several spreading branches towards the top: the leaves about an inch long and a quarter of an inch broad, lucid green, and sessile. The flowers are produced at the ends of the branches; they are large, white on the outside, but of a bright purple within: wings expanded wide, and standard incurved. It continues flowering most part of the summer: each cell of the seed-vessel contains one hard smooth shining seed. It grows naturally at the Cape of Good Hope.

The second species rises with a slender, branching, woody stalk, about a foot high, when it grows upon good ground, but on a rocky soil it is seldom more than half that height. The branches are closely garnished with stiff smooth leaves, of a lucid green: from between the leaves, towards the top of the branches, the flowers come out upon very short peduncles; they are white on the outside, but within are of a purplish colour mixed with yellow, and have a grateful odour. According to Martyn, it is an elegant little evergreen shrub, of low growth, with leaves like those of Box, producing flowers from May to October, but most plentifully in May and June: each flower stands on a peduncle, proceeding from a kind of triphyllous cup, formed of floral leaves. It is a native of Austria, &c.

Culture.—The first sort may be increased by seeds, which should be sown in small pots, filled with light loamy earth; soon after they are ripe, placing them where they may have the morning sun only till October, when they should be placed under a hot-bed frame, and be plunged into old tanners bark which has lost its heat, where they may be defended from frost during the winter, and in the spring the pots should be plunged into a moderate hot-bed, which will bring up the plants. When these appear, they should not be too tenderly treated, but have a large share of free air admitted to them; when they are fit to transplant, they should be carefully shaken out of the pots, and separated, planting each into a small pot filled with soft loamy earth, and plunged into a very moderate hot-bed, to forward their taking new root, shading them from the sun, and gently refreshing them with water as they may require. When they are rooted, they must be gradually inured to the open air, and in June they may be

placed abroad in a sheltered situation, where they may remain till the middle or latter end of October, according as the season proves favourable; then they must be removed into the green-house; and treated in the same way as the Orange-tree, being careful not to give them too much wet during the winter season.

The second sort was formerly thought difficult to raise by seeds; but at present it is readily increased by parting its creeping roots, and planting them in bog earth, on a shady border, where it thrives very well, and spawns much.

The first affords variety when set out among other potted plants of the green-house kind; and the latter, in the borders, &c.

POLYGONUM, a genus containing a plant of the herbaceous annual kind.

It belongs to the class and order *Octandria Trigynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that the calyx is a turbinate perianth, coloured internally, five-parted; segments ovate, blunt, permanent: there is no corolla, unless the calyx be taken for it: the stamina have commonly eight filaments, awl-shaped, very short: anthers roundish, incumbent: the pistillum is a three-sided germ: styles commonly three, filiform, very short: stigmas simple: there is no pericarpium: calyx involving the seed: the seed single, three-sided, acute.

The species cultivated is *P. orientale*, Oriental Persicaria.

It has a root composed of many strong fibres, growing in tufts: the stem is jointed, eight or ten feet high, the lower part becomes woody, and as thick as an ordinary walking-cane, of a fine green, and a little hairy: the leaves are alternate, often a foot long, and six inches broad in the middle, terminating in acute points; they have one strong midrib, and several transverse veins, which run upwards towards the point; their surfaces are a little hairy, the upper of a bright green, and the under paler: the petioles are broad, half embracing at their base: the flowers in close terminating spikes, seven or eight inches long, hanging downwards: the stamens five, six or seven. The stipules are deserving of notice, being unusual in their form, and making the stem look as if ruffled. Thunberg remarks that the margin of the stipules is entire and revolute. It is a native of the East Indies, flowering from July to October.

There is a dwarf variety, and another with white flowers.

Culture.—This plant is constantly raised from seeds, and is said to rise from scattered seeds better than when sown: but where they are sown, it should be in autumn, soon after they

are ripe, as when sown in the spring they rarely succeed; or if some plants come up, they seldom grow so strong. They may be removed in the spring into the borders of the plantation or flower-garden, giving them room. They are, however, commonly sown in the spring with other annuals; thinning the seedlings, when they appear, so as to stand a foot apart. About the beginning of July the side shoots should be pruned off, to make them advance in height, and preserve them within compass; and when they are pruned up to five or six feet, they may be permitted to shoot out side branches. It delights in a rich moist soil. The plants are sometimes sown on hot-beds, in March, in order to be more forward.

These plants are distinguished for their superior stature and the brilliancy of their flowers: they frequently grow to the height of eight or ten feet, and rival the sun-flower.

POMEGRANATE. See PUNICA.

POMPION. See CUCURBITA.

POMUM. See PYRUS.

POPPY. See PAPAVER.

POPPY, HORNED. See CHELIDONIUM.

POPPY, PRICKLY. See ARGEMONE.

POPULUS, a genus containing plants of the hardy deciduous tree kind.

It belongs to the class and order *Diœcia Octandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male—the calyx is an oblong ament, loosely imbricate, cylindrical, composed of one-flowered, oblong, flat scales, torn at the edge: the corolla has no petals: the nectary one-leafed, turbinate below, tubular, ending at top obliquely in an ovate border: the stamina have eight, extremely short filaments: anthers four-cornered, large: female—the calyx and scales as in the male: the corolla has no petals: nectary as in the male: the pistillum is an ovate-acuminate germ: style scarcely manifest: stigma four-cleft: the pericarpium is an ovate capsule, two-celled, two-valved: valves reflex: the seeds numerous, ovate, flying with a capillary pappus.

The species cultivated are: 1. *P. alba*, White Poplar; 2. *P. tremula*, Trembling Poplar Tree, or Asp; 3. *P. nigra*, Black Poplar Tree; 4. *P. dilatata*, Lombardy or Po Poplar Tree; 5. *P. balsamifera*, Common Tacamahaca Poplar Tree; 6. *P. canadensis*, Heart-leaved Tacamahaca Poplar Tree; 7. *P. laevigata*, Smooth Poplar Tree; 8. *P. monilifera*, Canadian Poplar Tree; 9. *P. Græca*, Athenian Poplar Tree; 10. *P. heterophylla*, Various-leaved Poplar Tree; 11. *P. angulata*, Carolina Poplar Tree.

The first grows very tall, with a straight

trunk, covered with a smooth whitish bark: the leaves are smooth, blackish green above, but having a thick white cotton underneath; they are about three inches long, on petioles an inch in length, flatted and grooved on each side: in young trees the leaves are roundish, but in adult ones angular, divided into three, five or seven lobes; they are without glands, either at the base or on the serratures. The flowers are exactly similar to those of the second sort. It is a native of Europe, from Sweden to Italy; also of Siberia and Barbary.

There are two varieties; the Common White Poplar, and the Great White Poplar, or Abele. In the first, the leaves are rounder, and not much above half the size of those of the latter; and the shoots of the latter are paler, the catkins are larger, and the down of the seeds whiter and longer.

In the latter the leaves are large, and divided into three, four, or five lobes, which are indented on their edges; they are of a very dark colour on their upper side, and very white and downy on their under, standing upon foot-stalks, which are about an inch long: the young branches have a purple bark, and are covered with a white down, but the bark of the stem and older branches is gray. In the beginning of April the male flowers or catkins appear, which are cylindrical, scaly, and three inches long, and about a week after come out the female flowers on catkins, which have no stamina like those of the male. Soon after these come out, the male catkins fall off, and in five or six weeks after, the female flowers will have ripe seeds inclosed in a hairy covering, when the catkins will drop, and the seeds be wafted by the winds to a great distance. According to Mortimer, the best sort comes from Holland and Flanders. Hence in some places it is called Dutch Beech.

The second species has a green smooth bark. The leaves at first breaking out are hairy above and cottony underneath, but when full grown are smooth; they are slightly heart-shaped, smaller and more approaching to circular than in the preceding, with a few angular teeth on the edges. According to Linnæus they are rolled inwards at the edge, and have two glands running one into the other on the inner side above the base. He also observes, that the leaf-stalks are flatted towards the end, whence the perpetual trembling of the leaves with every breath of wind: but the petioles being flat in the White and Black Poplars, as well as in this, Dr. Stokes accounts better for the phenomenon, from the plane of the long leaf-stalks being at right angles to that of the leaves, which allows them a

much freer motion than could have taken place had their planes been parallel. This trembling of the leaves has been so generally noticed as to have become proverbial. This tree is of speedy growth, and will grow in any situation or soil, but worst in clay. It impoverishes the land: its leaves destroy the grass, and the numerous shoots of the roots spread so near the surface, that they will not permit any thing else to grow. The wood is extremely light, white, smooth, woolly, soft, durable in the air. Pannels or pack-saddles, canns, milk-pails, clogs, pattens, &c., are made of the wood. It is a native of Europe, from Sweden to Italy.

The third has a naked lofty trunk, covered with an ash-coloured bark, and a regular handsome head: the leaves are slightly notched on their edges, smooth on both sides, and of a light green colour. They have no glands at the base, but the serratures are glandular on the inner side: the petioles are yellowish. It is a tree of quick growth, and on the banks of rivers and in moist situations it grows up to a great height, throwing out numberless suckers from the roots. It loves a moist black soil, and bears cropping well: the bark, being light like cork, serves to support the nets of fishermen. The wood is not apt to splinter: it is light and soft, and sometimes used by turners. It is incomparable, according to Evelyn, for all sorts of white wooden vessels, as trays, bowls, and other turner's ware; and is of especial use for the bellows-maker, because it is almost of the nature of cork, and for ship-pumps, though not very solid, yet very close and light. It affords useful rafters, poles, and rails, and in a proper soil makes a very quick return for such purposes. It is excellent for flooring-boards, and is much used for the purposes of deal in some midland counties. It is a native of Europe, from Sweden to Italy.

The fourth species differs from the third sort chiefly in its close conical manner of growth, like the Cypress. The leaves are greater in breadth than length, whereas in that the longitudinal diameter is the greatest.

This has been esteemed by some as no more than a variety of that; and indeed it can scarcely be considered as a distinct species. It has been stated in Mr. Young's Annals, that the Italian Poplar is fit to cut for building uses in twelve years, and that at eight years growth they are forty feet high. For rafters, small beams, studs, boards, &c. it is very durable.

The peculiar use of it in this country has hitherto been for ornamental plantations, and covering unsightly buildings. To the latter purpose its upright close conical mode of growing, with its feathering very readily down to the very

ground, particularly adapts it. The conic form of it, as a deciduous tree, is peculiar. Among evergreens we find the same character in the Cypress; and both trees in many situations have a good effect. One beauty the Italian Poplar possesses which is almost peculiar to it; and that is the waving line it forms when agitated by wind. Most trees in this circumstance are partially agitated; one side is at rest, while the other is in motion; but the Italian Poplar waves in one simple sweep from the top to the bottom, like an ostrich-feather on a lady's head. All the branches coincide in the motion; and the least blast makes an impression upon it, when other trees are at rest. Although this tree sometimes has a good effect, when standing single, it generally has a better when two or three are planted in a clump.

In the fifth, the growth seems not to be to a very large size: the bark is smooth, like that of the third sort; the young branches have much the same appearance, but their annual shoots are seldom more than a foot in length. The leaves resemble those of the Pear-tree; are about four inches long, and an inch and half broad in the middle, drawing towards a point at each end; their upper side is of a deep green, and their under side is hoary; they stand upon long foot-stalks, and are placed without order upon the branches. The male flowers come out from the side of the branches in long catkins, in April and May, and fall off soon after; their stamens are numerous, irregular in height, and crowned with headed anthers of a purple colour. The hermaphrodite flowers are produced at the end of the shoots upon long slender peduncles, in very loose catkins, having a leafy involucre under each, which is oval and entire; and from the bosom of that arises the peduncle, which is very short. Upon the top is placed the petal or calyx, (or nectary, according to Linnæus) shaped like a wide cup, having a large style in the centre, and two stamens on one side, terminated by pyramidal purple anthers. These flowers appear in July, and are succeeded by oval capsules terminating in a point, and inclosing downy seeds. The scaly covers of the buds abound with a tenacious balsam in the spring, becoming liquid by heat. It is of a yellowish colour and a fragrant scent. It is a native of Canada and some other parts of North America.

There are varieties, with much wider leaves; the Daurian, with a longer ovate leaf, more like this sort; and an Altaic variety, with a lanceolate leaf.

In Siberia the trunk is straightish, not tall, covered with an ash-coloured bark; the wood reddish, closer, and a little harder than in the

common Poplars. The branchlets in the Altaic tree are more slender, and rod-like; in the Daurian thick, short, knobbed, and wrinkled, with a yellow skin sometimes of a very deep colour: the leaves in the rod-like variety ovate-acuminate, in the Altaic commonly lanceolate; in the common Daurian ovate and thicker, so as to be in a manner coriaceous; in both very sharp, serrate, quite smooth, shining as if varnished, deep green above, pale underneath: aments terminating, thick, the female ones ripening in June; containing ovate thick rugged capsules, subcalyced with the receptacle, scarcely peduncled.

The sixth species is resinous, like the preceding; but the leaves are different, being hollowed next the petiole and drawn out at the point. It flowers earlier, as in March. It is a native of Canada.

The seventh is a native of North America, flowering in March and April.

The eighth species is a native of Canada, flowering in May.

The ninth resembles the tenth species in growth and foliage. It is a native of the islands of the Archipelago, flowering in March and April.

The tenth species is a large tree, having numerous branches, veined and angular; the leaves broad and slightly serrate: flowers in loose aments, making little show. It is a native of Virginia and New York, flowering in April and May.

The eleventh shoots very strong, and is generally cornered, covered with a light green bark like some sorts of willow. The leaves upon young trees, and also upon the lower shoots, are very large; but those upon older trees are smaller: as the trees advance their bark becomes of a lighter colour, approaching to gray: the aments are like those of the third sort; and the anthers are purple. It grows naturally in Carolina, where it becomes a very large tree, and flowers in March.

Culture.—All the sorts are readily increased by cuttings, layers, and suckers.

The planting of the cuttings is the most expeditious mode of raising all these trees, as they grow freely without any trouble, when made either from the young year-old shoots, a foot and a half in length, and planted a foot in depth, or large truncheons of two, three, or more years growth, from about a yard to five or six feet long, planted in moist places: though these large cuttings or truncheons are not proper for general plantations, only in some particular parts, as in a marshy or watery situation, where shade and shelter, &c., may be required as soon

as possible, in which they may be planted finally to remain, putting them in to the depth of one or two feet.

In order to raise plants for regular plantations, or for handsome standards, it is the best method to raise them principally from young cuttings of one year's growth, or two at most. These young cuttings should be made about fifteen or eighteen inches long, and planted out in nursery-rows two feet asunder, placing each cutting two parts or half-way in the ground, and about a foot distant in the lines, they readily take root, and make good shoots the following summer, care being taken to trim off the straggling laterals in order to encourage the leading shoot to grow straight, and rise more expeditiously in height: after having had from two to four or five years growth in this situation, they may be finally removed for the purposes for which they are wanted.

The layers may be laid down in autumn, choosing the lower young shoots, which are conveniently situated, laying them by slit-laying. They will be well rooted, and fit to remove by the autumn following, in nursery-rows, to have two or three years growth.

The suckers, which some of the sorts send up in abundance from the roots, as the fifth sort, may be taken up after the fall of the leaf, and be planted in nursery-rows, as directed for the cuttings. They form good plants in two years.

The plants raised in any of the above methods, after having obtained from two or three to five or six years growth, are of a proper size for furnishing plantations, or other places.

These trees are also capable of being raised from seed, if care be taken to gather a quantity as soon as ripe; and sow them in autumn, in beds either broad-cast or in drills, half an inch in depth.

These trees may be employed in assemblage for ornament in out-grounds, which are detached from fine lawns and walks, as on account of the great litter the falling of their catkins in some sorts occasions, they are improper, but are excellent for planting towards the boundaries of parks, paddocks, and fields, the sides of rivers and brooks, and to intersperse with other trees in large plantations, in any interior parts. The White Poplar, the Carolina, Tacamahaca, Lombardy and Athenian Poplars, are proper to introduce as ornamental trees, and are finely adapted to be employed in assemblage in forming large avenues, open groves, and clumps in parks, &c., though any of the sorts are eligible on the same occasions to increase the variety; and all the sorts may be employed

to advantage in any large tracts of plantation. To marshy grounds no trees are better adapted than Poplars, especially the first three species, all of which thrive remarkably in moist situations.

As forest or timber trees, the White, Black, Tremulous, and Lombardy Poplars are proper to be employed.

Marshy lands may be improved to much advantage by coppices of these trees, to cut every four, five, or six years for poles, and other small purposes; being planted in rows a yard asunder, and in seven years they will be fit to cut for many small uses, and the stools shooting up again strong, afford a cutting every four or five years afterwards.

Some sorts may also be planted occasionally to form hedges in moist or other situations, more particularly the Lombardy Poplar, as this sort is peculiar in branching out numerously from the bottom upwards, and may be planted hedge-fashion along the sides, or top of outward watery ditches, in large plants, so as at once to form a hedge; they being topped to five, six, or seven feet.

PORRUM. See **ALLIUM**.

PORTLANDIA, a genus containing plants of the trailing evergreen exotic kinds, for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rubiaceæ*.

The characters are: that the calyx is a five-leaved perianth, superior: leaflets oblong-lanceolate, permanent: the corolla one-petalled: tube long, funnel-form-ventricose: border shorter than the tube, five-parted, acute: the stamina have five awl-shaped filaments, declined, almost the length of the corolla, from the bottom of the tube: anthers linear, erect, the length of the corolla: the pistillum is a five-cornered germ, roundish, inferior: style simple, the length of the stamens: stigma oblong, obtuse: the pericarpium is an obovate capsule, five-streaked, five-cornered, retuse, two-celled, two-valved; opening at the top; partition contrary: seeds very many, roundish, compressed, imbricate.

The species cultivated is *P. grandiflora*, Great-flowered Portlandia.

It has a shrubby, upright stem, branched, knotty, with a smooth bark cracking longitudinally: the branches opposite, spreading, round, scarcely divided, leafy, covered with smooth green bark: the buds are gummy: the leaves opposite, spreading, somewhat lengthened at the point, equal at the base, entire, very smooth, paler beneath, marked with alternate veins projecting on both sides: the footstalks

are very short, thick, round below but flattish above: the stipules between the leaves, connate, triangular, pointed, very smooth, pale, closely pressed to the branch: the flowers axillary, mostly solitary, between the stipules, peduncled, a little nodding, very large, white, beautiful, most fragrant at night, in the bud yellowish tipped with red. It was found in the West Indies, flowering in July and August.

Culture.—These plants may be raised either from seeds or cuttings.

The seeds when procured should be sown in pots, filled with light earth, in the spring, plunging them in the tan-bed, in the stove. When the plants are sufficiently strong, they should be removed into separate pots, and be replunged in the bark hot-bed, where they must be constantly kept.

The cuttings of the young shoots should be planted out singly, in pots filled with the same sort of mould, plunging them in the bark-bed of the stove; when they have taken good root they should be removed into larger pots, replunging them into the tan-bed, where they must remain.

They afford a fine effect, when trained on the back part of the stove, in their larger flowers.

PORTULACA, a genus containing plants of the herbaceous and shrubby kinds.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a bifid perianth, small, compressed at the tip, permanent (two-leaved, superior, caducous): the corolla has five petals, flat, erect, blunt, larger than the calyx: the stamina have many filaments (to twenty), capillary, shorter by half than the corolla: anthers simple: the pistillum is a roundish germ (half inferior): style simple, short: stigmas five, oblong, the length of the style: the pericarpium is a covered capsule, ovate, one-celled (cut transversely): receptacle free (five, free, separate): the seeds numerous, small.

The species cultivated are: 1. *P. oleracea*, Garden Purslane; 2. *P. Anacampseros*, Round-leaved Purslane.

The first is an annual herbaceous plant, with a round, smooth, procumbent, succulent stem, frequently red, and diffused branches, often throwing out fibres at the joints: the leaves more or less wedge-shaped, oblong, blunt, fleshy, smooth, quite entire, sessile, clustered, especially at the ends of the branches: the flowers are sessile, scattered: corollas yellow, spreading; petals subtruncate at the tip and emarginate: the stamens ten: the capsule one-

celled, opening horizontally: the seeds round, black, very small. It is a native of both Indies, China, Cochinchina, and Japan. It was formerly much in request as a wholesome salad and pickle, but at present is little in use.

There are several varieties. The garden Purslane differs from the wild, only in having larger and more succulent leaves. If it be permitted to scatter the seeds, in two years it will become in every respect like the wild plant. Of the two other varieties, one is with deep-green leaves, and the other with yellow leaves, which is called Golden Purslane.

The second species has a shrubby stalk, four or five inches high: the leaves are thick and succulent. At the top of the stalk comes forth a slender peduncle about two inches long, supporting four or five red flowers, appearing in July, but not succeeded by seeds in England. It is a native of the Cape of Good Hope.

Culture.—These plants may be increased by seeds and cuttings, according to the different kinds.

In the first sort, the seeds should be sown in slight drills, or broad-cast over the surface, at different times, in the spring and summer, from March to June, or later, at the distance of three weeks, the early sowing being made on slight hot-beds, but the late ones in the open borders, where the ground is light and dry, occasional light waterings being given afterwards, both before and after the plants appear, which must remain where they come up, and are mostly fit for cutting in the course of a month or five weeks. In gathering them, the young tops should be cut off with a knife, and they afterwards shoot out fresh tops.

In the second sort the cuttings should be planted in pots filled with light dry mould, and plunged in the tan-bed, in order to promote their rooting, moderate shade and waterings being given till they have stricken good root, being kept in the stove, and afterwards managed as the succulent kinds of aloes.

The last affords variety among other stove potted plants.

PORTULACARIA, a genus furnishing a shrubby plant of the succulent green-house kind.

It belongs to the class and order *Pentandria Trigynia*.

The characters are: that the calyx is a two-leaved perianth, coloured, permanent: leaflets roundish, concave, obtuse, spreading very much, opposite: the corolla has five obovate petals, obtuse, quite entire, concave at top, flat at the base with the sides mutually incumbent, spreading very much, almost three times as long as the calyx, permanent: the stamina have five

awl-shaped filaments, very short, erect, two on each side of the germ, the other solitary: anthers erect, ovate: the pistillum is a three-cornered germ, superior, the length of the petals: style none: stigmas three, spreading very much, ascending at the tip, mucicated above: there is no pericarpium: the calyx and corolla, now erect, closely embrace the base of the seed: the seeds single, ovate-oblong, obtuse, winged-three-sided.

The species is *P. Afra*, African Purslane Tree.

It rises with a strong thick succulent stalk to the height of three feet, sending out branches on every side, so as to form a kind of pyramid; the lower branches being extended to a great length, and the others diminishing gradually to the top; they are of a red or purplish colour and very succulent. The leaves are also succulent and roundish, very like those of Purslane, whence the gardeners call it the Purslane Tree. It is a native of Africa. It is not known that it has yet flowered in this climate.

Culture.—It is readily increased by cuttings of the stems or branches, planted during any of the summer months, having been laid to dry for some days before, in pots filled with sandy earth, being placed in a frame, and shaded in hot weather, and protected from wet. They are also much forwarded by being plunged in the bark-bed of the stove. It must be placed in a warm glass case in winter, where it may enjoy the full sun, and should have very little water during that season. In summer the plants should be placed abroad in a sheltered situation, and in warm weather be refreshed with water twice a week; but the stalks being very succulent, too much wet is always hurtful.

These afford variety among other green-house plants.

POTATOES. See *SOLANUM*.

POTATOES, CANADA. See *HELIANTHUS TUBEROSUS*.

POTENTILLA, a genus containing plants of the herbaceous and shrubby kinds.

It belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is a one-leaved, flattish, ten-cleft perianth: the alternate segments smaller reflex: the corolla has five roundish petals, spreading, inserted by their claws into the calyx: the stamina have twenty filaments, awl-shaped, shorter than the corolla, inserted into the calyx: anthers elongate-lunulate: the pistillum has numerous germs, very small, collected into a head: styles filiform, the length of the stamens, inserted into the side of

the germ : stigmas obtuse : there is no pericarpium : common receptacle of the seeds roundish, juiceless, very small, permanent, covered with seeds, inclosed within the calyx : the seeds numerous, acuminate-wrinkled.

The species chiefly cultivated are : 1. *P. fruticosa*, Shrubby Cinquefoil ; 2. *P. fragarioides*, Strawberry-leaved Cinquefoil ; 3. *P. recta*, Upright Cinquefoil ; 4. *P. Monspeliensis*, Montpellier Cinquefoil ; 5. *P. grandiflora*, Great-flowered Cinquefoil.

Other species may be cultivated for variety.

In the first, the whole plant is set with fine silvery hairs : the stems erect, clothed with a brown bark which cracks longitudinally, branching very much, about three feet (or in gardens four feet) high, frequently reddish : the leaves alternate, covering the branches, petioled, quinate-pinnate, or consisting of five rarely seven oblong leaflets, somewhat rolled back, quite entire, hairy underneath ; the upper ones ternate. Dr. Withering remarks, however, that the leaves can hardly be called pinnate, consisting of two pairs set cross-wise, rising from the same point, with a terminating one divided down to the base into three open segments ; and that the leaflets are linear-lanceolate, turned back at the edges, dark green above, pale underneath. Flowers terminating, solitary, peduncled, of a bright yellow or golden colour, and very ornamental. It is a native of Oeland, England, Siberia, and China, flowering here in June and July.

It has a beautiful appearance, in its numerous flowers.

The second species has the root somewhat tuberous : the leaves silky on hairy petioles, with three, five, or seven leaflets, which are ovate, opposite, serrate, lessening as they approach the base : the runners are decumbent. It is a native of Siberia.

The third has a stem about a foot high, rigid, covered with a pile rather than hairs, reddish, at top corymbed, or dividing into several peduncles forming a sort of umbel : the leaves are large, having each five or seven oblong villose leaflets, frequently of a russet colour, with ten or twelve blunt teeth ; when old almost naked : the lower ones are petioled, the upper ones sessile, finally becoming linear and stipular. The flowers are abundant on the top of the stem, erect on solitary peduncles, altogether making the stem panicled. It is a native of Germany and the South of Europe, flowering in June and July.

The fourth species is a perennial plant : the stalks grow erect, about a foot high ; they are very hairy : the leaflets oblong, serrate : the peduncles come out above the joints of the stalk :

the flowers are white and large : they come out in June ; and the seeds ripen in autumn. It is a native of the South of France.

The fifth has also a perennial root : the stems trailing : the leaflets ovate, obtuse, bluntly indented on their edges : the flowers larger than in the fourth sort, and the whole plant of a deeper green. It flowers in July, and the seeds ripen in autumn. It is a native of Switzerland and Siberia.

Culture.—The first sort may be readily increased by suckers, layers, and cuttings, which may be laid down or planted out in the autumn or spring season, and be removed into the nursery in the spring following ; and after having two or three years growth in that situation, they will be fit for planting out in the clumps and shrubby borders.

When removed from their natural situations into these places, the best season is in the autumn, before the frosts begin, that they may get well rooted. They should be watered occasionally in dry weather.

They succeed best in a cool moist soil and shady situation.

All the other kinds may be increased by parting the roots, and planting them out in the autumn, or by sowing the seeds either in the autumn or spring seasons.

They all afford ornament and variety in the different parts of pleasure-grounds.

POTERIUM, a genus containing plants of the herbaceous and shrubby perennial kinds.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Miscellanæ*.

The characters are : that the calyx is a four-leaved perianth : leaflets ovate, coloured, caducous : the corolla four-parted : segments ovate, concave, spreading, permanent : the stamina have very many filaments, (thirty to fifty) capillary, very long, flaccid : anthers roundish, twin.—Female flowers in the same spike above the males : the calyx a perianth as in the male : the corolla one-petalled, wheel-shaped : tube short, roundish, converging at the mouth : border five-parted : segments ovate, flat, reflex, permanent : the pistillum has two, ovate-oblong germs, within the tube of the corolla : styles two, capillary, coloured, flaccid, the length of the corolla : stigmas pencil-form, coloured : the pericarpium is a berry formed of the tube of the corolla, hardened, thickened, closed : the seeds two : inverted.

The species are : 1. *P. Sanguisorba*, Lesser Upland or Common Garden Burnet ; 2. *P. hybridum*, Sweet Burnet ; 3. *P. spinosum*, Prickly Shrubby Burnet.

The first has a perennial root, penetrating deep into the earth: the stems nearly upright, from nine inches to a foot high, and a foot and half in cultivation; branched, striated, reddish, smooth except at bottom, where they are slightly hairy: the leaves unequally pinnate, on pretty long peduncles, next the root collected into a tuft, on the stem alternate: the leaflets smooth, pale or bluish underneath, deeply serrate about the edge, the lower ones on the same leaf commonly alternate, and the upper ones opposite: the bottom leaves have seven or eight pairs of roundish leaflets; the stem-leaves have five or six, or at top only two pairs of ovate pointed leaflets: the petiole is three-cornered, channelled, hairy, and somewhat membranaceous at the base. Stipules toothed: the flowers are peduncled in little roundish heads; greenish, sometimes purplish on the outside, the terminating one largest; each head has male flowers below, and female or fertile flowers above, expanding before the former, which are frequently imperfect hermaphrodites. It is a native of England, Germany, Switzerland, &c., flowering in May, and sometimes in April.

It is frequently cultivated for winter and spring salads, and for cool tankards.

The leaves and seeds are mildly astringent, and have been used in dysenteries and hæmorrhages.

The second species is a biennial plant, decaying soon after the seeds are ripe: the leaves are composed of three or four pairs of oblong leaflets, placed a little alternate; they are deeply indented, and have an agreeable scent: the stems two feet high, with one of these leaves at each joint, gradually diminishing in size to the top; and just above the leaf arises a long peduncle, which supports two or three small ones, each sustaining a small roundish spike of flowers. These appear in July, and are succeeded by seeds which ripen in autumn. It is a native of the South of France, Italy, and Barbary.

The third has a shrubby stalk, rising about three feet high, and dividing into several slender branches, armed with sharp branching thorns; the leaves are very small, unequally pinnate, with six or seven pairs of opposite leaflets, of a lucid green, and continuing all the year: the flowers of an herbaceous colour, in small heads at the ends of the branches: they appear the beginning of June, and there is a succession of them most part of the summer; but those only which come early, are sometimes succeeded by seeds in England. It is a native of the Levant.

Culture.—The first sort may be readily increased by seeds and parting the roots.

The seeds should be sown in the autumn, on

a bed or border of light mould, when they are perfectly ripened. When the plants have attained two or three inches in height, they should be planted out on a bed, at the distance of a foot, when for salads, or in the borders where they are to remain.

The roots may likewise be parted in the autumn, and planted where they are to remain, in the same manner as the above.

The second sort may be increased in the same way.

And the last sort may be raised from slips or cuttings, which should be planted in a bed of light earth during the summer season, and covered with glasses or in pots, and placed under a frame and glasses, giving shade and water occasionally.

They may also be had more forward by plunging the pots in a moderate hot-bed under glasses. They should be removed into separate pots when they have stricken good root and are well established. They should afterwards be protected from frosts in the winter, by being placed in a mild hot-bed, and have but little water in the winter season.

The first sorts are ornamental in the borders, clumps, and other parts, and the last among other potted greenhouse plants.

POT, GARDEN, such as are made use of for plants and flowers.

Pots of these kinds are particularly necessary in the culture of numerous sorts of plants, such as all tender exotics of the greenhouse and stove sorts, which must be planted in them for the convenience of moving them in and out of their departments as there may be occasion.

They are also exceedingly useful in raising many young seedlings and cuttings that require moving to occasional shade, shelter, and artificial heat; likewise for many young plants that are tender whilst young, and require to be removed under shelter for the first two or three winters, but become hardy enough afterwards to bear the full air the year round; and likewise to plant many of the more curious hardy flowering plants and others, and choice flowering shrubs, &c. in, to remove occasionally to adorn particular compartments or situations.

In general there are about eight different sizes of this sort of pots made use of, which are necessary in order to suit the different sorts of plants, as well as all sorts in their different stages of growth; as when the plants are young and of small size, they may be first planted in small ones, and as they increase in bulk be shifted into those a size larger, repeating it as often as necessary. See **PLANTING in POTS and SHIFTING PLANTS.**

The several sizes are in regular gradation, each size having its name for the convenience of readily supplying the sizes wanted for particular uses, being always reckoned by the cast at the houses, from two to sixty pots to each, according to their sizes, the largest having only two to a cast, and the smallest sixty; so that, being of eight different sizes or casts, they are distinguished by the following terms, twos, eights, twelves, sixteens, twenty-fours, thirty-twos, forty-eights, and sixties; the several casts from the twos being in a gradual diminution in size, and the price of the different casts is the same; those of two, &c., being as much as those of sixty, and so of the rest: from two to three shillings is the general price per cast at the potteries in the vicinity of London.

In garden pots there is also a particular shallow sort of a wide, squat, pan-form make, used on some occasions, especially among the myrtle-gardeners in the neighbourhood of London, in raising great quantities of these plants annually, in order to have always a regular succession advanced to proper growth, for the markets. These kinds of wide shallow pan-pots are employed to prick or plant out the requisite supplies of numerous small myrtle cuttings, in summer, &c., for annual propagation, and which are commonly called store-pans.

In these store-pans they generally prick a great number of such small slips or cuttings, at only about an inch or two apart, often to the amount of hundreds in each, just to strike them, and remain two or three months or more, till advanced a little in growth; in which time the pans thus stored are convenient for removing to different situations required, such as, at first planting or afterwards, either into a hot-bed, whereby to strike the cuttings more expeditiously, or for the same advantage, when in want of hot-beds, to be placed under a garden-frame and lights, or under hand-glasses, either with or without a hot-bed; and also for removing to a green-house or garden-frame, for protection in winter, &c., all of which being thus continued in them, according to the progress of growth which they make; so that, when they discover themselves to be well struck in bottom radicles and have shot a little top, they may be pricked out separately into small pots, or occasionally three, four, or five in larger ones, for a year, then separated as above, or sometimes bedded out in the spring in beds of natural earth, six or eight inches apart, to acquire an advanced state of growth till autumn, and then potted off singly.

The same kind of pan-pots are also useful for several other purposes of propagation, both to

sow seeds and plant small cuttings, slips, &c. in, of tender exotics, and of various other sorts of curious or particular kinds of plants, both of the green-house, hot-house, and the open ground, in order to have similar culture as the above. These pan-pots are from ten to twelve, or fourteen inches in width, and about six inches deep, having holes at bottom as in the common kind. And another sort of pot of different make from the general kind is sometimes used for planting some kinds of bulbous roots in, for blowing in the apartments of the house: they are narrow and upright, of equal width from bottom to top, six, eight, or ten inches deep, or a little more, and from three to four or five inches in width; and are occasionally used for planting bulbs of the Guernsey lily and some other similar kinds, to blow in autumn and winter, in the windows or on the chimney-piece of the dwelling or sitting-room, or in a green-house, or hot-house, &c., as they appear neat, and admit of being placed close, or in a smaller space than the common pots, one bulb being planted in each; they being previously filled with light sandy earth to near the top. See PLANTING in POTS.

All these several sorts of pots may be obtained at the potteries in the different parts of the kingdom.

In choosing the pots it is necessary to see that they are burnt sufficiently hard, and so perfectly sound as to ring when struck with your knuckles, and that they have all holes at the bottom to discharge the superfluous moisture from the earth about the roots of the plants, the larger sorts having generally four holes, one in the middle of the bottom, and three around the circumference, at equal distances; but the smaller kinds commonly only one in the middle of the bottom.

In respect to the sizes of pots that are proper for the different sorts of plants, it is commonly mentioned in the culture of the plants where any particular sizes are necessary.

Where small pots are advised, it is generally to be understood either as sixties, forty-eights, or thirty-twos, according to the sorts or sizes of the plants that are to be potted.

POTTING OF PLANTS. The operation of placing or planting different sorts of plants, roots, and cuttings, &c., in pots. In this business more care and attention is necessary than is generally bestowed.

POT-HERBS, such as are used for different culinary purposes, consisting of different sorts of the small aromatic kind, and some others. But in a more general signification they comprehend many of the other kitchen garden vege-

tables, but are principally understood to be such as are in request to improve soups, broths, and some other similar culinary preparations, in which, sometimes, several different kinds of small herbs are used in different proportions, both in composition, and singly.

They are chiefly the following sorts: thyme, marjoram, savory, sage, parsley, mint, penny-royal, sorrel, chervil, basil, coriander, dill, fennel, marigold, borage, burnet, tansy, tarragon, chives, leeks, onions, green-beet, white-beet, spinach, celery, endive, lettuce, love-apple, capsicum, and purslane.

Those made use of separately, as salad-herbs, are green and white spinach, to boil as separate dishes; celery, endive and lettuce, as choice salad herbs, and sometimes to stew. But of the above, the thyme, marjoram, savory, parsley, sage, mint, marigold, penny-royal, leeks, celery, and onions, are in the greatest request.

Proper supplies of the different sorts may be raised in the manner directed, under their particular heads. See AROMATIC and KITCHEN GARDEN PLANTS.

PRASIUM, a genus containing plants of the low shrubby exotic evergreen kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatae*.

The characters are: that the calyx is a one-leaved perianthium, campanulate-turbinate, erect, bilabiate: upper lip wider, semitrifid, acute; lower lip a little smaller, two-parted: the corolla one-petalled, ringent: upper lip erect, ovate, obsoletely emarginate, concave: lower lip wider, trifid, reflex: the middle segment larger: the stamina have four awl-shaped filaments, pressed to the upper lip, spreading, shorter than the upper lip: two shorter than the two others: anthers oblong, lateral: the pistilum is a quadrifid germ: style filiform, length and situation of the stamens: stigma bifid, acute, with one segment shorter: the pericarpium consists of four berries, at the bottom of the calyx, roundish, one-celled: the seeds are solitary, roundish.

The species are: 1. *P. majus*, Great Spanish Hedge Nettle; 2. *P. minus*, Small Spanish Hedge Nettle.

The first rises with a shrubby stalk two feet high, covered with a whitish bark, and divides into many branches which are declining: the leaves are the size of those of baum, cordate, smooth, blunt, petioled. The flowers come out from the bosom of the leaves in whorls round the stalks: are white, and have large permanent calyxes, cut into five points. It is a native of Spain, &c., flowering here from June to August.

The second species has a shrubby stalk like the former, but rises a little higher: the bark is whiter, the leaves are shorter and ovate, and of a lucid green: the flowers are somewhat larger, and are frequently marked with a few purple spots. It is a native of Sicily.

Culture.—These plants may be increased by seeds and cuttings.

The seeds should be soon on a bed of light mould, in the early spring season, as about April, the plants being afterwards kept clear from weeds, and in the following autumn be removed and placed in the situations where they are to remain, or in pots to be gradually hardened as they advance in growth.

The cuttings should be taken from such plants as are strong, and where the shoots are short and good, and if a joint of the former year's wood be taken to each of them, they succeed better. They should be planted out either in a shady border or in pots in the latter part of the spring season, as about the end of April. When the plants have stricken good root in the borders, they should be removed into the situations where they are to remain, and those in pots into separate ones. These in pots should be placed under a frame during the winter, or in the green-house, where they can have plenty of free air when the season is dry. They only require to be screened from severe frosts. When planted in the open ground they should have a dry poor soil and sheltered situation. These plants afford much ornament in the green-house collections, and among other evergreen shrubs of the more hardy kinds.

PRICKLY PARSNEP. See ECHINOPHORA.

PRICKLY PEAR. See CACTUS.

PRIMROSE. See PRIMULA.

PRIMROSE NIGHTLY, or TREE. See OBNOTHERA.

PRIMROSE PEERLESS. See NARCISSUS.

PRIMULA, a genus containing plants of the low fibrous-rooted herbaceous flowery perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Preciae*.

The characters are: that the calyx is a many-leaved involucre, many-flowered, very small: perianthium one-leaved, tubular, five-cornered, five-toothed, acute, erect, permanent: the corolla monopetalous: tube cylindrical, the length of the calyx, terminated by a small hemispherical neck: border spreading, half-five-cleft: segments obcordate, emarginate, obtuse: throat pervious: the stamina have five very short filaments, within the neck of the corolla: anthers acuminate, erect, converging, included: the



Painted by J. Edwards

London Published June 23rd 1806 by G. Kearsley Fleet Street

Engraved by F. Sargent

1 *Primula veris.*
Oxlip.

2 *Paonia tenuifolia.*
Fine leaved Paony

pistillum is a globular germ: style filiform, the length of the calyx: stigma globular: the pericarpium is a capsule cylindrical, almost the length of the perianth, covered, one-celled, opening with a ten-toothed top: the seeds numerous, roundish: receptacle ovate-oblong, free.

The species cultivated are: 1. *P. vulgaris*, Common Primrose; 2. *P. elatior*, Great Cowslip or Oxlip; 3. *P. officinalis*, Common Cowslip or Paigle; 4. *P. farinosa*, Bird's-eye Primrose; 5. *P. longifolia*, Long-leaved Bird's-eye Primrose; 6. *P. cortusoides*, Cortusa-leaved Primrose; 7. *P. marginata*, Silver-edged Primrose; 8. *P. Auricula*, Auricula or Bear's-ear.

The first has a perennial root, growing obliquely, appearing as if bit off at the end, beset with thick reddish scales which are the remains of past leaves, sending down numerous very long round whitish fibres; it has a singular smell, somewhat like that of anise: the leaves are obovate-oblong, about a hand's-breadth in length, nearly upright, tapering to the base, bluish, veiny, wrinkled, smooth above, hirsute beneath, rolled back at the edge when young, slightly waved, unequally notched, the midrib whitish, terminating in a footstalk of a reddish colour, channelled on one side and keeled on the other: the scapes or peduncles numerous, the length of the leaves, upright, round, hirsute, pale green, having awl-shaped bractes at the base, after the flowering is over bending back: the flowers upright, large, sweet-scented: the corolla is of a pale sulphur colour; each of the five clefts obcordate, and marked at the base with a spot of a much deeper yellow: the mouth has a faint rim round it. The flower of the wild Primrose is a pale brimstone colour; but in some places it is found of a purple hue.

The varieties are numerous, being partly wild and partly produced by cultivation. The principal of which are; the Common Yellow-flowered: the White: the Paper-white: the Red: the Double Yellow: the Double White: the Double Red: the Double Pink: the Double Crimson Primrose. It is a native of most parts of Europe, flowering in March and April with the Wood Anemone.

It is observed, that a fine flower of this sort should possess a graceful elegance of form, a richness of colouring, and a perfect symmetry of parts. The properties are mostly similar to those which distinguish the Auricula, in what relates to the stem or scape, the peduncles or flower-stalks, and the formation of the umbel, bunch or thyrse, vulgarly termed the *truss*: the tube of the corolla above the calyx should be short, well filled at the mouth with the anthers,

and fluted termination rather above the eye: the eye should be round, of a bright clear yellow, and distinct from the ground colour: the ground colour is most admired when shaded with a light and dark rich crimson, resembling velvet, with one mark or stripe in the centre of each division of the border, bold and distinct from the edging down to the eye, where it should terminate in a fine point: the petals, technically termed the pips, should be large, quite flat, and perfectly circular, excepting the small indentures between each division, which separate it into five (sometimes six) heart-like segments; and the edging should resemble a bright gold lace, bold, clear and distinct, and so nearly of the same colour as the eye and stripes, as scarcely to be distinguished from it.

The second species has the leaves contracted towards the middle, almost as in the Cowslip: the scapes few, erect, longer than the leaves, many-flowered: the flowers umbelled, pedicelled, the outer ones generally nodding; like those of the Primrose in form and colour, but smaller. From which it is evidently distinguished by its many-flowered scape; as it is from the cowslip by the flat border of the corolla. It is found in the woods and other places in this Country, flowering in April and May.

Martyn remarks that if it be a variety, it is rather of the former than the latter. And Dr. Smith rather inclines to think that it is a hybrid production, or mule from a Primrose impregnated by a Cowslip.

It varies much in the colour of the flowers, but the chief are purple-flowered, red-flowered, gold-coloured, orange-coloured; with various shades of each.

The third has a root like that of the Primrose, but smelling more powerfully of anise: the leaves obovate-oblong, contracted suddenly towards the middle, or rather ovate with the petiole winged, shorter than those of the Primrose by nearly one half, fuller at the edge, which is somewhat folded as well as notched, stronger, of a deeper green, not running so taper at the base, covered on the under side with softer and shorter hair: the petioles smoother, whitish with scarcely any red in them: the scapes few, three or four times longer than the leaves, round, upright, pale, villose: the involucre at the base of the umbel, surrounding the peduncles, consisting of many, very small, concave, pale, acuminate leaflets: the flowers in an umbel, unequally pedicelled, hanging down, generally to one side, full yellow with an orange-coloured blotch at the base of each segment, contracted about the middle of the tube, where the stamens are inserted,

paler underneath, very fragrant. It is a native of Europe, flowering in April and May.

The varieties are the Common Single Yellow Cowslip; Double Yellow Cowslip; Scarlet Cowslip; and Hose, and Hose Cowslip.

The fragrant flowers of these plants make a pleasant wine, approaching in flavour to the muscadel wines of the South of France. It is commonly supposed to possess a somniferous quality.

The fourth species has a perennial root, somewhat præmorse, with numerous, long, perpendicular fibres, and sweet-scented: the leaves obovate-lanceolate, bright green, smooth and even, thickish, here and there turned back on the edges, underneath veined and powdered with white meal: the scape a hand's-breadth or span in height, far exceeding the leaves, round, upright, stiff and straight, of a pale green colour and mealy: the flowers sweet-scented, of a purple yellow colour, in an upright umbel, having at its base a many-leaved involucre, each leaflet of which is awl-shaped, and placed at the base of each peduncle. It is an elegant plant; is a native of many parts of Europe, flowering in July and August.

It varies in the size of the plant, having been found wild a foot and half in height, and in the cultivated plant a tendency to become viviparous, has been observed by Curtis, or to produce one or more tufts of leaves among the flowers of the umbel. In its wild state it seeds readily, and frequently when cultivated: the flowers also vary with different shades of purple, and have been found entirely white.

The fifth bears a great affinity to the fourth, but the leaves differ in form, colour, and mode of growth; when fully grown being twice the length of those of the other: they are not mealy, the under side being as green as the upper, and they have a greater tendency to grow upright: the scape is shorter and thicker: the flowers form a similar umbel, but each is smaller, and in point of colour much less brilliant. Upon the whole, though superior in size, it is inferior to that in beauty. It flowers early in May.

The sixth species, in the wrinkled appearance of its foliage, approaches the first sort; whilst in its inflorescence, the colour of its flowers, and solitary scape, which rises to an unusual height, it bears an affinity to the fourth. In the winter it loses the leaves entirely, and forms a sort of bulbous hybernacle under ground: this circumstance is necessary to be known, as it subjects the plant to be thrown away as dead. It flowers in June and July; and is a native of Siberia.

The seventh, in its farinaceous tendency, ac-

cords with the eighth sort, but is very unlike it in its wild state, the leaves being much narrower: the flowers larger, and of a different colour: the colour of the flowers approaches to that of lilac: it becomes mealy, particularly on the edges of the leaves, between the serratures, where it is so strong as to make the leaf appear with a white or silvery edge. It is a delicate pretty plant, with a pleasing musky smell, and flowers in March and April. It is probably a native of the Alps.

The eighth species has the leaves fleshy, succulent, with the edges mealy, serrated; or entire, according to some—deeply and equally toothed all round, as others affirm; while some say that the young leaves are entire: the adult ones serrate above the middle: the petioles leafy or winged: the leaflets of the involucre unequal, wide, lanceolate or blunt: the flowers very sweet, four or five, in an upright umbel: the calyx one-third of the length of the tube of the corolla, bell-shaped, toothed, mealy, as is also the scape: the tube of the corolla gradually widening upwards, not contracted at the neck: the border concave: the segments emarginate but not deeply, and not cut to the neck: the most common colours are yellow or red, but it is found also purple and variegated, with a white eye powdered with meal: capsule spherical or nearly so, flattened a little at top, of a coriaceous-cartilaginous substance, sprinkled with meal. It is a native of the mountains of Switzerland, Austria, &c., flowering in April and May.

It varies much in the leaves and flowers; as the oblong-leaved; roundish-leaved; broad-leaved; narrow-leaved; green-leaved; white- or meal-leaved; the purple-flowered, of various shades and variegations; red-flowered, with different shades and variegations; yellow-flowered, of different shades; double purple-flowered; double yellow-flowered; variegated purples, &c.

With regard to the properties of a fine auricula, they are these according to Martyn: "The stem should be strong, upright, and of such a height as that the umbel of flowers may be above the foliage of the plant: the peduncles or footstalks of the flowers should also be strong, and of a length proportional to the size and quantity of the flowers; which should not be less than seven in number, that the umbel may be regular and close: the tube, eye, and border should be well proportioned; which they will be, if the diameter of the first be one part, of the eye three, and the whole border six parts or thereabouts: the circumference of the border should be round or nearly so, or at least not what is called starry: the anthers ought to be large, bold, and fill the tube well; and the tube

should terminate rather above the eye, which should be very white, smooth and round, without cracks, and distinct from the ground-colour: the ground-colour should be bold and rich, and regular, whether it be in one uniform circle or in bright patches: it should be distinct at the eye, and only broken at the outer part into the edging: a fine black, purple, or bright coffee-colour contrast best with the white eye: a rich blue, or bright pink is pleasing, but a glowing scarlet or deep crimson would be most desirable, if well edged with a bright green; this, however, can seldom be expected: the green edge is the principal cause of the variegated appearance in this flower, and it should be in proportion to the ground-colour, that is, about one-half of each: the darker grounds are generally covered with a white powder, which seems necessary, as well as the white eye, to guard the flower from the scorching heat of the sun's rays."

It is observed, that all flowers that want any of the above properties are turned out into the borders of the garden or rejected wholly by every good florist; for as there are varieties every year from seeds, the bad ones must make room for their betters: but in some the passion for new flowers so much prevails, that supposing the old flower to be greatly preferable to a new one, the latter must take place, because it is of their own raising.

Culture.—These beautiful plants are raised without much difficulty, by proper care and attention in their management with respect to the parting of the roots, and the planting them out in their due season; they succeed best in a strong soil, and some of them, as the Primrose kind, in a shady situation.

Culture in the Polyanthus kinds.—These are all capable of being increased by seed and the parting of the roots, the former being the only method for obtaining new varieties, or a large supply of plants. The seed should be collected from such flowers as have large upright stems, and which produce many flowers upon the stalk, being large, beautifully striped, open, flat, and not pin-eyed, as from such seed a great variety of good sorts may be expected; care should be however taken that no bad or common flowers stand near them, as they will be apt to debase them, by the admixture of their farina.

The seeds should be sown in boxes or large pots filled with light rich mould. The proper season for this business is in the autumn, or the early spring; but the former is the better, as by sowing then the plants come up well the same year, and are strong and fit to plant out the following spring, and are fine plants for

flowering the second spring. In the first season the sowing should be performed as soon as possible after the seed becomes well ripened, though some advise December as a good time; but when in the latter, or the spring season, it may be done in February, March, or the following month. The seed should be sown over the surface tolerably thick, being covered in very lightly, and the boxes or pots placed where they may have a little of the morning sun, but not by any means the mid-day heats. The plants may be much forwarded by the pots or boxes being plunged in a mild hot-bed; in the spring, when dry, they should be frequently refreshed with water, in very moderate proportions at a time, removing the plants more into the shade as the heat advances, as it soon destroys them. The autumn-sown plants should have a warm situation during the winter, or be protected from frosts or severe weather by glasses or other means.

In the spring or early summer the plants of the different sowings will be sufficiently strong to plant out, for which a bed or shady border should be prepared, and made rich by neat's dung, on which the plants should be set out about four or five inches distant in every direction, care being taken to water them occasionally till well rooted, after which they only require to be kept free from weeds; and when they flower in the following spring the best flowers should be marked, and the rest be removed into the borders or other places for affording variety; and the valuable plants may be removed, when they have finished flowering, into the borders or beds where they are designed to flower and remain, in the same manner as above, watering them slightly till well rooted again. The roots afterwards require to be parted and removed annually, and the earth of the borders renewed, to prevent their degenerating.

It is necessary, in order to keep up a proper stock of plants, to raise new seedling plants every two or three years, as the old plants mostly decline in beauty after the third year.

In the latter method, the roots should be parted in the beginning of the autumn, as soon as the flowering is over, and it may likewise be done early in the spring; but the former is the best time, as the plants get stronger and flower better in the spring.

In performing the work the plants should be taken up out of the ground, and each bunch divided into several slips, not too small, unless where a great increase is wanted, being careful to preserve some root to each slip; they are then to be planted in a fresh dug border, enriched with dung as above, setting them five or six

inches asunder, giving them water directly, and repeating it occasionally till they have taken good root. The approved sorts may in this way be easily preserved.

These plants are observed by the editor of Miller's Dictionary to be very liable to the depredations of snails and slugs, in the spring of the year; the plants and pots therefore should be carefully examined on all sides early in the morning. But their worst enemy is a small red spider or *Acarus*, which in summer forms its web on the under side of the leaves. These little insects, scarcely visible without a magnifying glass, cause the leaves to become yellow and spotted, and eventually destroy the plant: they multiply with such rapidity as to take possession of a whole collection in a very short time. Such plants as appear infected should therefore be immediately selected from the rest, taken up, and soaked for two or three hours in a strong infusion of tobacco water, and then replanted in a fresh soil or compost, and removed to a situation at a distance from the former. But if the whole bed or border be overrun with this insect, it is best to take up all the plants, and, having soaked them, to plant them elsewhere. The bed or border should then be trenched up, and remain fallow to the next season, or be planted with another crop not liable to this calamity.

In their after-management, they are said to "blow at the same time, and require nearly the same treatment, as *Auriculas*, both with respect to soil and situation; they are however more impatient of heat and drought, and more partial to shade and moisture. They may be set in the same sized pots, and in the same compost as the *Auricula*, only with the addition of more loam; or they may be planted on cool shady beds or borders, being very hardy, and seldom perishing in the coldest and wettest seasons, because their parent is a native of this country; but during the heats of summer they are frequently destroyed, unless proper precautions be taken. This dislike of heat seems to indicate," it is added, "that the *Polyanthus* is rather the offspring of the *Primrose*, which requires shade, than of the *Cowslip*, which grows in open pastures; though Mr. Miller seems to regard it as a variety of the latter."

The roots of the wild plants, when they can be procured, may be taken up, divided, and planted out in the autumn, when they will flower in the following spring.

The fourth sort readily seeds in its wild state, and also frequently when cultivated: but it is scarcely worth the pains to raise it from seed, since a strong root may be divided so as to form

many plants; the best time for doing this is in the spring, soon after the leaves are expanded. Each off-set should be placed in a separate pot, filled with two parts of stiffish loam, and one part of light sandy bog earth, watering and setting them in the shade, under a north wall or paling, but not under trees, keeping them there during summer in pans of water, but in the autumn, as the wet season comes on, taking them out of the pans, and either laying the pots on their sides, or placing them during winter under a common cucumber frame, to keep them from immoderate wet, which this plant cannot bear, although it be a native of boggy meadows. In the following if not the same year these plants will blow strong; and they should be thus treated every year, as they require to have their roots frequently parted.

The fifth sort is increased by parting the roots, either in September or at the beginning of March. It is hardy, of ready growth, and will succeed either in the pot or border, by guarding it from the sun in summer and from severe frost and too much wet in winter.

The sixth species, which is yet a rare plant, must be treated with care, as the fifth sort, and may be raised from seeds, or increased by parting the roots; but it is apt to be lost if not well attended to.

The seventh sort is delicate, and should be placed in a pot of stiffish loam, mixed with one-third rotten leaves, bog-earth, or dung, and plunged in a north border, taking care that it does not suffer for want of water in dry seasons; as when thus treated it increases by its roots nearly as readily as the *Auricula*.

Culture in the Auricula kinds.—These plants may all be increased by seeds in order to procure new varieties, and by slipping the roots to increase the approved kinds.

In order to obtain good flowers from seeds, choice should be made of the best flowers, which should be exposed to the open air, that they may have the benefit of showers, without which they seldom produce good seeds: the time of their ripening is in June; which is easily known, by their seed-vessels turning to a brown colour, and opening, being then careful lest the seeds be scattered out of the vessel, as they will not be all fit to gather at the same time.

The proper soil for this sort of seed is good, fresh, light, sandy mould, mixed with very rotten neat's dung, or very rotten dung from the bottom of an old hot-bed; with which the pots, boxes, or baskets in which the seeds are to be sown should be filled; and having levelled the surface very smooth, the seeds should be

sown sifting over them a little rotten willow mould; then covering them with a net or wire, to prevent cats or birds from scratching out, or burying the seeds so as to destroy them. Some persons never cover the seeds, but leave them on the surface, for the rain to wash them into the ground, which is often the best method. The boxes, &c., should then be placed so as to receive half the day's sun, during the winter season; but in the beginning of March be removed, where they may have only the morning sun till ten o'clock; for the young plants now soon begin to appear, which, if exposed to one whole day's sun only, are all destroyed. The proper season for sowing the seed is in the latter end of summer, or beginning of autumn, as about September, but they may be sown in the spring.

During the summer season, the plants in dry weather should be often refreshed with water, never giving them too great a quantity at once. In the July following, the plants will be large enough to remove, at which time a bed must be prepared, or boxes, filled with the above-mentioned soil, in which they may be planted about three inches apart, and shaded when in beds, every day, till they are thoroughly rooted, as also in very hot dry weather; but if they are in baskets or boxes, they may be removed to a shady situation.

When planted in beds, there should be some rotten neats' dung laid about ten inches under the surface, and beaten down close and smooth: this will prevent the worms from drawing the young plants out of the earth, which they generally do where this is not practised. This dung should be laid about half a foot thick, which will entirely prevent the worms getting through it until the plants are well established in the beds; and the roots strike down into the dung by the spring, which makes their flowers stronger than usual: these beds should be exposed to the east, and screened from the south sun as much as is necessary.

In the spring following many of these flowers will show; when such of them as have good properties should be selected, which should be removed each of them into a pot of the same prepared earth, and preserved until the next season, at which time a judgment of the goodness of the flower may be formed; but those that produce plain-coloured or small flowers should be taken out, and planted in borders in the out-parts of the garden, to make a show, or gather for nosegays, &c.; the others, which do not produce their flowers the same year, may be taken up, and set out into a fresh bed, to remain till their properties are known.

VOL. II.

In the second method, the offsets or slips may be taken from the old roots, in the spring or autumn, and be planted into small pots filled with the same sort of earth as was directed for the seedlings, and during the summer season be set in a shady place, and must be often gently refreshed with water, and in the autumn and winter be sheltered from violent rains. In the spring following these plants produce flowers, though but weak; therefore, soon after they are past flowering, they should be put into larger pots, and the second year they will blow in perfection.

In order to obtain a fine bloom of these flowers, the plants should be preserved from too much wet in winter, which often rots and spoils them, letting them have as much free open air as possible; but not be too much exposed to the sun, which is apt to forward their budding for flower too soon; and the frosty mornings, which often happen in March, thereby destroying their buds, if they are not protected; to prevent which, those who are curious in these flowers place their pots in autumn under a common hot-bed frame, where, in good weather, the plants may enjoy the full air, by drawing off the glasses; and in great rains, snow, or frost, be screened by covering them.

About the beginning of February, when the weather is mild, the upper part of the earth in the Auricula pots should be taken off as low as can be, without disturbing their roots, filling up the pots with fresh rich earth, which greatly strengthens them for bloom. As those plants which have strong single heads always produce the largest clusters of flowers, the curious florist should pull off the offsets as soon as it can be done with safety to their growing, to encourage the mother plants to flower the stronger; they should also pinch off the flowers in autumn, where they are produced, and not suffer them to open, that the plants may not be weakened by it. The pots should be covered with mats in frosty weather, during the time of their budding for flower, lest the sharp mornings blight them, and prevent their blowing. When the flower-stems begin to advance and the blossom buds grow turgid, they must be protected from hasty rains, which would wash off their white mealy farina, and greatly deface the beauty of their flowers, keeping them as much uncovered as possible, otherwise their stems will be drawn up too weak to support their flowers, (which is often the case when their pots are placed near walls) giving them gentle waterings to strengthen them, but none of the water should be let fall into the centre of the plant, or among the leaves.

When the flowers begin to open, their pots

should be removed upon a stage (built with rows of shelves, one above another, and covered on the top, to preserve them from wet: this should be open to the morning sun, but sheltered from the heat of the sun in the middle of the day): in this position they will appear to much greater advantage than when they stand upon the ground; for, their flowers being low, their beauty is hid; whereas, when they are advanced upon shelves, they are fully seen. In this situation they may remain until the beauty of their flowers is past, when they must be set abroad to receive the rains, and have open free air, in order to obtain seeds, which will fail if they are kept too long under shelter. When the seed is ripe it should be gathered when it is perfectly dry, and exposed to the sun in a window upon papers, to prevent its growing mouldy, letting it remain in the pods till the season for sowing.

It is observed by the editor of Miller's Dictionary, that "those who are very nice in raising Auriculas, direct the compost to be made of one half rotten cow-dung two years old; one sixth fresh sound earth of an open texture; one eighth earth of rotten leaves; one twelfth coarse sea or river sand; one twenty-fourth soft decayed willow wood; one twenty-fourth peaty or moory earth; one twenty-fourth ashes of burnt vegetables, to be spread upon the surface of the other ingredients. This compost is to be exposed to the sun and air, turned over once or twice, and passed as often through a coarse screen or sieve; then be laid in a regular heap from fifteen to eighteen inches thick, and in this state remain a year, turning it over two or three times, and keeping it free from weeds."

It is added, that "the pots for Auriculas should be hard baked: the inner diameter of the top be six inches and a half, of the bottom four inches, and they should be about seven inches deep, for common-sized blooming plants: but smaller plants and offsets should have smaller shallower pots, and very large plants should have larger pots in proportion; the bottom should have a small degree of concavity, and the hole should be half an inch in diameter: the rims should project about half an inch, in order to take up and remove them with greater ease and safety. The pots should be buried in wet earth, or immersed in water three or four days or a week, before they are wanted, to take off their absorbent property."

In the after-management of the plants, they should be potted annually soon after bloom; curtailing their fibres, if grown very long, and cutting off the lower part of the main root if too long or decayed. The offsets at this season

strike freely, and become well established before winter. The plants should be carefully examined, and where any unsoundness appears, be cut out entirely with a sharp penknife, exposing the wounded part to the sun, and when it is quite dry, applying a cement of bees-wax and pitch in equal quantities, softened in the sun or before a fire. If the lower leaves be yellow or dried up, they should be stripped off in a direction downwards. Having put the hollow shell of an oyster over the hole of the pot, three parts of it should be filled with compost, highest in the middle, placing the plant there, with its fibres regularly distributed all round; then filling the pot up with the compost, adding a little clean coarse sand close round the stem on the surface, and striking the bottom of the pot against the ground or table to settle the earth. The true depth of planting is within half an inch of the lowest leaves, as the most valuable fibres proceed from that part; and the offsets will be thereby encouraged to strike root sooner. When these have formed one or more fibres of an inch or two in length, they may, by means of a piece of hard wood, or by the fingers, be separated with safety, and planted round the sides of a small pot, filled with the same compost, till they are sufficiently grown to occupy each a separate pot: if a small hand glass be placed over each pot it will cause the fibres to grow more rapidly; but if it be long continued, it will draw up and weaken the plants. And in the beginning of May, as soon as the operation of potting is finished, the plants should be placed in an airy, shaded situation, but not under the drip of trees. Here they may remain till September or October, when they should be removed into shelter.

The plants should, in the first favourable weather in February, be divested of their decayed leaves; and by the middle of that month earthing them up; that is, taking away the superficial mould of the pots about an inch deep, and putting in fresh compost, with the addition of a little loam, to give it more tenacity. This contributes greatly to the strength of the plants, and the vigour of their bloom; at the same time it affords a favourable opportunity to separate such off-sets as appear to have sufficient fibre to be taken off at this early season. The pots with these off-sets should be placed in a frame, in a sheltered situation till their roots are established. Though frost, unless it be very rigorous, will not destroy the plants, it will injure them, and perhaps spoil the bloom, especially early in the spring; they should therefore be covered with mats in a severe season. When any plant has more than one or two principal stems, it is ad-

visible to pinch off the smallest and weakest, in order to render the blossoms of that which remains larger and more vigorous. And when the flowers (pips) become turgid and begin to expand, the plants should be selected from the rest, removing them to a calm shady corner, suspending small hand-glasses over them.

In this culture the stages for the pots to stand on whilst in bloom should have a northern aspect, and should consist of four or five rows of shelves, rising one above another, the roof being covered with frames of glass; the tallest blowing plants being placed behind, and the shortest in front. The plants must be regularly watered two or three times every week during the blooming season.

All these plants are highly ornamental; the former in beds and borders, and the latter sorts among curious potted flowering plants.

PRINCE'S FEATHER. See *AMARANTHUS*.

PRINCE'S WOOD. See *CORDIA* and *HAMELIA*.

PRINOS, a genus containing plants of the deciduous and evergreen shrubby sorts.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Dumosaë*.

The characters are: that the calyx is a one-leaved perianth, half-six-cleft, flat, very small, permanent: the corolla one-petalled, wheel-shaped: tube none: border six-parted, flat: segments ovate: the stamina have six awl-shaped filaments, erect, shorter than the corolla: anthers oblong, blunt: the pistillum is an ovate germ, ending in a style shorter than the stamens, and an obtuse stigma: the pericarpium is a roundish berry, six-celled, much larger than the calyx: the seeds solitary, bony, obtuse, convex on one side, angular on the other.

The species cultivated are: 1. *P. verticillata*, Deciduous Winter Berry; 2. *P. glabra*, Evergreen Winter Berry.

The first rises with a shrubby stalk to the height of eight or ten feet, sending out many branches from the sides the whole length: the leaves are lanceolate, about three inches long, and one inch broad in the middle, terminating in an acute point, of a deep green, veined on the under side, alternate on the branches upon slender footstalks: the flowers come out from the side of the branches, single or two or three at each joint: the berries are the size of those of Holly, turning purple when ripe. It flowers in July.

The second species has leaves alternate, petioled, oblong, of a firm texture, smooth, acute: there are commonly two serratures towards the tip: the peduncles axillary, small, commonly

three-flowered. It is of lower growth than the preceding; the leaves are shorter and serrate at their points only. It is a native of Canada, flowering in July and August.

Culture.—In these plants it is effected by seeds, sown soon after they are ripe, or early in the spring, upon a bed of light earth, covering them about half an inch with the same sort of earth: but the seeds which are put into the ground in the autumn will many of them come up the following spring, while those which are kept longer out of the ground, often remain a whole year before the plants appear, as in Holly, Hawthorn, and some others. The seeds may be forwarded in their growth by means of a hot-bed. When the plants have sufficient strength they should be planted out, some in nursery-rows and others in pots. They delight in a moist soil and a shady situation. In hot land they make little progress, and rarely produce any fruit.

They are ornamental, and afford variety in the pleasure-grounds and among potted plants.

PRIVET. See *LIGUSTRUM*.

PRIVET, MOCK. See *PHILLYREA*.

PROTEA, a genus containing plants of the ornamental shrubby exotic kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a common perianth, usually imbricate: scales permanent, various in form and proportion: perianth proper none: the corolla universal uniform: proper one, two or four petalled, with the petals different in figure: the stamina have four filaments, inserted into the petals below the tip: anthers linear: the pistillum is a superior germ, awl-shaped or roundish: style filiform: stigma simple: there is no pericarpium: calyx unchanged.

The species cultivated are: 1. *P. conifera*, Cone-bearing Protea; 2. *P. argentea*, Silvery Protea.

There are several other species that may be cultivated for variety.

The first has a stem erect, three feet high, with branches in whorls and subdivided: the leaves terminated by a concave smooth gland: the cone tomentose ovate, the size of a pea: the branches are in whorls and again subdivided, the leaves elliptic, the cone of flowers tomentose, and the floral leaves concolour.

The second species has a strong upright stalk, covered with a purplish bark, dividing into several branches which grow erect: the leaves broad, shining, silvery, making a fine appearance, when the plant is intermixed with other exotics. It flowers in August.

Culture.—These plants are increased by seeds, procured from the places of their native growth; which, as soon as obtained, should be sown in pots, filled with sandy loam, and placed in a moderate hot-bed; and when the plants are come up, moderate air should be given, or they should be placed in an airy glass case, or towards the front of a green-house; and be afterwards managed as other similar exotics of that kind.

They are also sometimes raised by cuttings, in spring and summer, by the assistance of a hot-bed, in the same manner. They should not have much water afterwards, nor be treated in too tender a manner.

They are ornamental among other potted plants.

PRUNING OF TREES. The operation of occasionally cutting out parts, in order to give them any desired form, and to retrench or reduce irregular and redundant or superfluous growths.

It is particularly necessary to be practised on many sorts of fruit-trees, more especially the dwarf sorts, such as all kinds of wall and espalier fruit-trees; it is also necessary, occasionally, for standard-trees, both dwarfs and half and full standards, and for some sorts annually, as all kinds of wall-trees, espaliers, and most other dwarf or trained fruit-trees; which is done in order to preserve the proper figure, and to keep them within their limited bounds, as well as to promote fruitfulness; but as to common standards, whose heads have full scope of growth every way, they require but very little pruning, except just to retrench any occasional redundancy, ill-growing branches, and dead wood. Wall-trees and espaliers require a general regulation in this way, twice every year: in summer, to retrench the evidently superfluous and ill-placed shoots of the year, and to train in a supply of the most regular ones; and in winter to give a general regulation both for the supply of young wood left in summer, and to the old branches where necessary.

In pruning these sorts of trees, as they have their branches arranged with regularity to the right and left, one above another, in a parallel manner, four, five, or six inches asunder, and forming a regular spread, so as the branches of each tree completely cover a certain space of wall, &c., and as the whole spread of branches constantly send forth every year a great number of unnecessary and useless shoots, each should be limited to a certain space. An annual pruning is consequently necessary to retrench the redundancies, and all irregular and bad shoots, to give the proper bearing branches due room, as well as to confine each tree within its proper limits, consistent with its regular form.

The first pruning for wall fruit-trees, to give the head its first regular formation, is effected by pruning short or heading down in spring all the shoots produced the first year from budding and grafting, and when a year old being mostly pruned down in March, within four or five eyes of the bottom, to throw the sap more into the remaining lower buds, and thus, instead of running up to one stem, to push forth several strong shoots from the lower part the ensuing summer, so as to fill the necessary space of walling and espalier regularly quite from the bottom, which shoots being trained straight and regular in a spreading manner, each at full length all summer; and in the winter or spring following, where a supply of more principal shoots shall seem necessary to form the head more effectually, pruning short also these shoots, each to four or five eyes, when they will throw out the same number of shoots the same year, which, according as they advance in length, should be trained at regular distances at full length during the summer, for the shoots of wall-trees should not in general be shortened in the summer season, as that would cause them to push forth many superfluous unnecessary lateral shoots; though sometimes, in order to fill a vacancy as soon as possible, strong young shoots, by being pinched or pruned early in the season, as May or beginning of June, to four or five eyes, will throw out several proper shoots the same summer. The work of pruning short should be occasionally repeated one or two years, either in general or on particular shoots, as may seem necessary, till a proper set of branches are by that means obtained to give the head of the tree a proper formation; afterwards it may be omitted, except occasionally to any particular shoot to fill a vacant space; but some sorts of wall-trees require almost a general shortening of their supply of shoots, such as peaches, nectarines, &c., which bear only on the young wood, have that of each year shortened, to force out a supply of shoots for future bearing: other sorts of wall-trees and espaliers are not, in the general course of pruning, to be shortened, such as pears, apples, plums, and cherries, which continue bearing in the same wood of from two or three to many years' growth. See **ESPA LIERS**.

When the trees have been thus furnished with a proper spread of branches trained regularly to the wall and espalier, they every year throw out many more shoots than are wanted, or can be converted to use, by some being too numerous, others ill placed, and others of a bad growth; all of which must therefore be regulated accordingly by proper pruning; as the regular figure of the tree, by being well furnished in

every part equally from the bottom to the top of the wall or espalier with proper branches, capable of producing good fruit, is the principal object of this operation.

In performing it the operator should be careful to free the trees of every thing that is superfluous, irregular, or hurtful, both in the summer and winter prunings. Those branches are superfluous, which though good and well placed, are more than wanted or that can be properly laid in, and those irregular which are so ill placed as not to be trained with regularity to the wall or espalier, such as all fore-right shoots, being such as grow immediately from the front or back of the branches in a fore-right direction; and those are hurtful which are of bad growth, such as all very rank or singularly luxuriant rude shoots. The superfluous or redundant growths should of course be thinned by pruning out all that seem to cause confusion; and the irregular and hurtful rank shoots be displaced, cutting all these off quite close to the place whence they proceed, only leaving a proper supply of the regular or best placed side-shoots where necessary, so as to preserve every part well furnished with bearing wood, trained straight and close to the wall or espalier, at equal distances. Some sorts of wall-trees, &c., however, require a general annual supply of young wood, such as peach and all other trees which bear only on the shoots of a year old; others require only an occasional supply of wood, such as apples, pears, &c., and all other kinds that bear on the old wood of from two or three to ten or twenty years old or more; so that the same branches continue in bearing many years, and the trees require only a supply of young shoots now and then to replace any worn out or dead branches. See **SUMMER and WINTER PRUNING**.

This art chiefly consists in being acquainted with the nature of bearing in the different sorts of trees, and in the forming an early judgment of the future event of shoots and branches, as well as other circumstances, for which some rules may be given; but there are particular instances which cannot be judged of but upon the spot, and depend chiefly upon practice and observation.

With regard to the nature or mode of bearing of the different sorts of wall- and espalier-trees, &c. peaches, nectarines, apricots, &c., all produce their fruit principally upon the young wood of a year old; that is, the shoots produced this year bear fruit the year following, and the same of every year's shoots; so that in all these trees, a general supply of the best regular shoots of each year should be every where preserved, both

in the summer and winter prunings, at regular distances quite from the bottom to the extremity of the trees on every side, in such order as to seem coming up regularly one after another; and trained principally all at full length during their summer's growth; but in the winter pruning generally shortened, according to the strength of the different shoots, in order to promote their throwing out more effectually a supply of young wood the ensuing summer, from the lateral eyes, in proper places for training in for the next year's bearing; the fruit-buds being mostly produced along their sides immediately from the eyes, as they rarely form any considerable fruit-spurs, as in the apple, pear, &c., the same shoots producing the fruit and a supply of shoots at the same time for the succeeding year's bearing. All these trees also bear on casual small natural spurs, sometimes arising on the two and three years' wood, one or two inches in length, which are generally well furnished with blossom buds in the proper season; and should be preserved for bearing; always however depending on the main young shoots as the principal bearers.

Vines also produce their fruit always upon the young wood, shoots of the same year arising from the eyes of the last year's wood only, and must therefore have a general supply of the best regular shoots of each year trained in, which in the winter pruning should be shortened to a few eyes or joints, in order to force out shoots from their lower parts only, properly situated to lay in for bearing fruit the following year.

Figs bear also only upon the young wood of a year old, a general supply of it is of course necessary every year; but these shoots should at no time be shortened, unless the ends are dead, as they always bear principally towards the extreme part of the shoots, which if shortened would take the bearing or fruitful parts away. And these trees mostly throw out naturally a sufficient supply of shoots every year for future bearing without the precaution of shortening them.

And as to apple-, pear-, plum-, and cherry-trees, they bear principally generally on spurs arising in the general branches, of from two or three to ten or twenty years old, the same branches and spurs continuing bearing a great number of years, as has been seen, so that having once procured a proper set of branches, in the manner already directed, to form a spreading head, no further supply of wood is wanted than only some occasional shoots now and then to supply the place of any casual worn-out or dead branch as before suggested; these spurs or

fruit-buds are short robust shoots, of from about half an inch to one or two inches long, arising naturally in these trees, first towards the once extreme parts of the branches of two or three years old; and as the branch increases in length, the number of fruit-buds increases likewise; this therefore determines, that in the general course of pruning all these kind of trees, their branches that are trained in for bearing must not be pruned or shortened, but trained at full length, as where shortened it would divest them of the parts where fruit-buds would have first appeared, and, instead thereof, would throw out a number of strong unnecessary wood-shoots, from all the remaining eyes; therefore all the shoots or branches of these trees should be trained principally at full length, and as they advance still continue them entire. When however there is a vacancy, and only one shoot, where two or three may be requisite, pruning or shortening is allowable to force out the proper supply. See DWARF TREES.

In these trees care is necessary to preserve all the proper fruit-buds or spurs, which are readily distinguished by their short, thick, robust growth, rarely exceeding one or two inches in length.

In the course of pruning all sorts of wall- and espalier-trees, all improper and ineffectual shoots and branches, necessary to be displaced, must be taken off quite close to the place whence they arise; which in the summer pruning, if attended to early, while the shoots are young and tender, may readily be rubbed off close with the thumb; but when the shoots become older and woody, as they do not readily break, it must be done with a knife, cutting them as close as possible: all winter pruning should however be performed with a knife.

In pruning in summer, the necessary supply of regular shoots that are left for training in, should never be shortened, unless to particular shoots to fill a vacancy, or to reduce within bounds any too long extended shoots; as by a general shortening in this season, all the shoots so treated would soon push again vigorously from every eye, and run the trees into a perfect thicket of useless wood; therefore all sorts, whether they require shortening in the winter pruning or not, should, in the summer dressing, be layed in at full length.

Summer Pruning.—This is a necessary operation, as in spring and summer wall- and espalier-trees abound with a great number of young shoots that require thinning and other reforms to preserve the requisite regularity and beauty of the trees, and encourage the fruit; and the sooner it is performed, the better; it is therefore advisable to begin in May or early in the

following month, and disburthen the trees in time of all redundant or superfluous growth, and ill placed and improper or bad shoots; which may be then performed with more expedition and exactness than when delayed till after the trees have shot a considerable length and run into confusion and disorder: besides the injury of the fruit is prevented. It is therefore of importance to proceed in this operation early, when the same year's shoots are sufficiently formed to enable you to make a proper choice.

The business now is to thin and regulate the unnecessary shoots, by pruning away the superfluous ones, and all such as are ill-placed and of bad growth, retrenching the most irregular-placed, weakest, and all such as are evidently not wanted for use, and where two or more shoots any where arise from the same eye, clearing all away but one of the best, reserving a sufficiency of the moderately strong and most regular-placed side shoots, and always a leading one at the end of every branch, where it commodiously occurs; all of which should be retained to be regularly trained in to choose from in the winter pruning, leaving more or less in proportion, according to what the trees are, or the mode of bearing, though in all those trees that bear always on the young wood, at least doubly or trebly more shoots should be left in this pruning than what may appear necessary, especially of peaches, nectarines, apricots, vines, figs, &c., as it is highly requisite to reserve plenty of regular young wood in summer, to choose from in winter pruning; to lay in for next year's bearers; but as to apples, pears, plums, cherries, &c., which continue bearing many years on the same branches, only here and there some good well-placed shoots need be left towards the lower parts, or in any vacancy between the main branches till winter; and if then not wanted, be easily retrenched.

Where, however, a tree is in general inclined to luxuriance, it is proper to retain as many of the regular shoots as can be commodiously trained in with any regularity, in order to divide and exhaust the too abundant sap, which causes the luxuriance; as by humouring somewhat the natural inclination of luxuriant trees by leaving plenty of branches and these mostly at full length, they may the most readily be reduced to a more moderate state of growth.

Great attention should always be paid to the lower parts of the trees, as it is frequently the case to find proper shoots arising in places necessary to be trained in, either to supply a present or future vacancy, or as a reserve to replace any decayed or worn-out or other bad branch, so that if moderately strong well-

placed shoots arise in such parts, they are particularly to be regarded at this time; and in winter pruning, such of them as are not wanted may be easily cut out and removed: but all weak trifling shoots should now be taken out.

After having summer-pruned and cleared any tree from all useless shoots, all the remaining proper shoots should be directly, or as soon as they are long enough, trained in straight and close to the wall or espaliers, at full length. When there is any great vacancy in some particular part, it may however be proper to cut or prune one or more contiguous shoots to three, four, or five eyes or buds, in order to promote an emission of laterals accordingly the same season, more effectually to supply the vacant spaces; but all the rest should be trained at full length till winter pruning, when they must undergo another regulation. Those of such trees as require it, as peach, nectarine, &c., should be shortened.

The work of training in the shoots in this season, is performed when against walls, both by nailing, by means of proper shreds and nails, and occasionally, by fastening in the smaller shoots, with little sticks or twigs stuck between the main branches and the wall; and for espaliers, by tying them with small osiers, rushes, or bass strings.

After having thus summer-dressed and trained the trees, it will be necessary to look them occasionally over, in order to reform such branches or shoots as may have started from their places or taken a wrong direction, and according as any fresh irregular shoots are produced, they should be displaced; and likewise as the already trained shoots advance in length or project from the wall or espalier, be trained in close, continuing them at full length during their summer's growth; every thing being kept close and regular, by which the trees will appear beautiful to the eye, and the fruit show itself, and attain its due perfection more effectually.

Winter-Pruning.—In this pruning, a general regulation must be produced both in the mother branches, and the supply of young wood laid in the preceding summer. The proper time for this work is, in most wall-trees, any time in open weather, from the fall of the leaf in November until March. And in performing the business, it is proper to unmail or loosen a great part of the branches, particularly of peaches, nectarines, apricots, vines, and such other trees, as require an annual supply of young wood, and considerable regulation in the general branches.

All the principal or mother branches should

first be looked over, and examined, to see if any are worn out or not furnished with parts proper for bearing fruit, and such branches be cut down either to the great branch from which they proceed, or to any lower shoot or good branch they may support toward their bottom part, leaving these to supply its place; likewise examining if any branches are become too long for the allotted space either at sides or top, and reforming them accordingly, by shortening them down to some lower shoot or branch properly situated to supply the place; being careful that every branch terminates in a young shoot of some sort for a leader, especially in all parts where room to extend them, according as the limited space admits, having the leader either placed naturally at the termination of the branch; or, where too long in any particular parts of the tree, pruned conformably to some lower shoot, &c., so as that it may still terminate in a proper leader, and the extended branches not cut to naked stumpy or stubbed ends, as is often practised by inexperienced pruners. And from the principal or larger branches, pass to the young wood of the year: or, in proceeding both in the occasional reform among the principal or older branches, and more general regulation in the young wood of the year, or shoots of the preceding summer, the above intimations relative to the principal branches should be observed in the pruning in the whole, both on the old and young wood, and be carried on regularly together at the same time, cutting out or retaining according to circumstances; as for instance, in the older wood observing the above particulars, and as below, and in the general supply of young wood, cutting out close all fore-right and other irregular shoots that may have been omitted in the summer-pruning; likewise all very weak shoots, and those of very luxuriant growth, unless it be necessary to keep some to supply a vacant place; then of the remaining regular shoots, selecting a greater or smaller portion to leave either as a general supply for next year's bearing, as is requisite for peaches, nectarines, apricots, vines, and figs; or only in others some occasional shoots, such as in full-trained apple-, pear-, plum-, and cherry-trees, &c., either sometimes to furnish casual vacancies, or to supply the places of any defective or improper branches, or ineffectual bearers, as may casually occur, or that of decayed or dead wood.

But as peach, nectarines, apricots, vines, and figs, always bear principally on the year-old wood, as already noticed, a general supply of young shoots must be left in every part from

bottom to top at regular distances, and, at the same time, some proportional part of the most naked old wood, and of the two preceding years past bearers, be pruned out to make proper room for this requisite young successional supply of future bearers in the following summer, to be now retained in a general manner, both laterally, and as terminals to the general patent branches, which should be pruned accordingly; and mostly all the said supply of the present retained shoots, except the fig, must be more or less shortened according to their situation and strength, to encourage their furnishing more readily a proper supply of shoots in spring and summer for the succeeding year's bearing, as noticed before, leaving the strongest shoots always the longest, as is more fully explained under each of their respective *genera*; but as the figs always bear towards the end of the shoots they must not be shortened.

With respect to the apples, pears, plums, cherries, &c., as they continue to bear on the same branches of from two or three to many years standing, the said bearers must be continued accordingly; and the trees only require an occasional supply of young wood, according as any of the branches become defective, or unfit for bearing, and want removing; which should now be cut out as may seem necessary, training in here and there in proper places some good regular young shoots towards the lower part, and where it may seem necessary, to be coming gradually forward to a bearing state, to be ready to replace worn-out and other useless branches, to be cut out, as they may occur: and of the young wood, selecting what may appear necessary of the best well-placed shoots, and the superabundance, or those not wanted for that purpose, together with all irregular-placed shoots, rank luxurians, and other ineffectual growths, should be now cut clean out, close to whence they originate, not leaving any spur or stump, as every one would push out several strong unnecessary shoots the next spring, to the prejudice of the trees and fruit: particular regard should be paid to preserve the shoots at the termination of all the already trained branches entire, but not more than one to terminate each branch; preserving also carefully all the proper fruit-spurs, taking care that the supply of young wood be occasionally reserved, and the branches in general of these trees be trained in at full length, and continued so in future, as far as the limited space will admit: and according as any extend above the wall or espalier or any where beyond their proper limits, they be pruned down with discretion to some convenient

bud, or lateral shoot, or lower branch, which should be trimmed entire.

In this pruning, as in the summer dressing, it is of importance to have a strict eye to the lower parts of wall-trees, &c., to see if there is any present vacancy or any that apparently will soon happen; in which cases, if any good shoot is situated contiguous, it should be trained in either at full length, or shortened to a few eyes to force out two or more shoots if they shall seem necessary; for precaution should ever be observed in taking care to have betimes a sufficient stock of young wood coming forward to fill up any casual vacancy, and substituting a new set of branches in place of such as are either decayed or stand in need of retrenchment.

In wall-trees and espaliers there are sometimes many large disagreeable barren spurs, consisting both of old worn-out fruit spurs, and of clusters of stumps of shortened shoots projecting considerably from the branches, occasioned by unskilful pruning when retrenching the superabundant and irregular shoots, which, instead of being cut out close, are stumped off to an inch or two long, and in the course of a few years, form numerous barren stumps, and very little fruit, the trees appearing like a stumped hedge. In this season of pruning, (in this case) it is proper to reform them as well as possible by cutting all the most disagreeable stumps clean out close to the branches, leaving these at full length, especially in apples, pears, &c., and reserving an occasional supply of young wood in different parts: thus in two or three years such trees may be reduced to a regular figure and a proper state of bearing.

It is observed that bad pruning ruins many a good tree, as is observable in numerous gardens, where the wall-trees and espaliers appear as just described, pruned every year, yet never producing any tolerable crop of fruit.

Severe injudicious pruning in strong wood is greatly prejudicial to the health of some sorts of stone-fruit-trees, by causing them to gum and soon decay. Plums and cherries, in particular, are often greatly damaged by a too severe discipline of the knife, these being very liable to gum by large amputations: it is therefore of importance to attend to these trees well in the summer-pruning, to retrench all the superfluous and irregular shoots betimes in the summer while quite young, and pinch others occasionally where wood is wanted to fill vacancies, so as to require but little pruning out of large wood in winter.

A general nailing, &c., must every year be performed, according as the pruning advances,

as it is proper that every tree, as soon as pruned, be directly nailed to the wall, or if espaliers, tied or nailed to the treillage, being careful in the winter pruning, as the work of nailing, &c., will require to be performed more or less upon all the branches, to train them with great regularity, nailing them along horizontally, as straight and close as possible; never crossing any of the branches, but training them distinctly and parallel four to five or six inches asunder, or in proportion to the size of the leaves and fruit of the different sorts, making the opposite branches of each side arrange equally in the same manner and position.

Pruning of Standard Trees.—Standard fruit-trees require but very little pruning; for, as their branches have full scope above to extend themselves every way, they must not be shortened: besides, as the standard fruit-trees, consisting principally of apples, pears, plums, and cherries, bear fruit on natural spurs arising towards the upper parts of the branches, this determines that they must not be shortened, nor any other pruning be practised than just to reform any great irregularity, &c., in them. In these trees, the first occasional pruning necessary is the first two years of their growth, in order to form their heads somewhat regular, by retrenching any irregular shoots; and when designed to have them form more regular spreading heads, to prune the first shoots, when a year old, down to four or five eyes, in order to force out lateral shoots from these lower buds the following summer, to give the head a proper formation. After this, the branches should be suffered to take their natural growth, except that, if, while the trees are young, any very luxuriant shoots ramble away considerably from all the others, and draw most of the nourishment, it is proper to prune them, either by retrenching entirely very irregular ones, or shortening others to some regularity, to branch out consistently with the requisite form of the head of the tree; but except in such cases of reducing irregularities, the heads of all kinds of standards always should be left to branch away as fast as possible, both in length and laterally, agreeably to their natural mode of growing; and they will naturally furnish themselves abundantly with bearing wood.

In standard fruit-trees of some years' growth, as irregularities and disorder will occasionally happen, they should be regulated a little by pruning out the most conspicuously irregular and redundant growths in the winter season.

For instance; where any considerable branches grow right across others, or in any other awkward direction, to incommode or cause confusion, or much irregularity in the head, they

Vol. II.

should be retrenched close; likewise any branch that rambles considerably from all the rest, should be reduced to order, by cutting it down to some convenient lower branch, so as to preserve some regularity. Where the head is considerably crowded with wood, let the worst of the redundancy be thinned out as regularly as possible, cutting them close to their origin; and as sometimes very vigorous shoots arise in the heart of the tree, or towards the bottom of the main branches, growing upright, and crowd the middle of the head, they should be constantly retrenched to their very bottom; cutting out also any very cankered parts, and all decayed wood; and clearing off all suckers from the root and stem. The standard trees thus disburthened from any considerable irregularities and confusion, so as all the proper branches have full scope to spread free and easy in their natural manner, will not fail to repay the trouble in the superior quality of their future fruit. See ORCHARD-TREES.

Pruning of Forest Trees, &c.—With respect to pruning of forest and ornamental trees, flowering shrubs, &c., it is very inconsiderable. Forest trees, &c., must be suffered to run up as fast as possible, so that their heads should not be shortened; all that is necessary is, to prune off the lateral branches occasionally from the stem; or, if while young, any lateral shoot of the head, which is of a very rude rambling growth; but otherwise suffering the top and general branches of the head to remain entire, and take their own natural growth; only pruning the lower stragglers occasionally. It is however very improper to trim up the stem too high, as often practised to forest trees, as scarce to leave any upper branches to form a head: never, therefore, trim the stem much higher than the full spread of the principal branches, as a full head is both ornamental and essentially necessary to the prosperity of the tree. See PLANTING.

And as to the shrub kind, they should, for the general part, take their own growth at top; and only be pruned occasionally in any lower stragglers, from the inferior part of the stem, or any very irregular rambling shoot of the head, and all dead wood. Except in these cases, their heads mostly should be suffered to shoot in their own way, according to their different modes of growth, in which they will appear always the most agreeable. Where, however, it is required to keep shrubs low, they must be regulated, as convenient; with the pruning-knife, as being more proper than the garden-shears, which should never be used in that business to shrubs and trees in rural growth.

The particular method to be followed with

each sort of tree has been shown under the proper head to which it belongs.

Pruning Implements.—For the purpose of general pruning, several implements are necessary, such as pruning-knives, saws, chisels, hand-bills, hatchets, &c. Two or three different sizes of knives are requisite, in order to prune neatly; a strong one for cutting out larger branches, shoots, &c., and a small one for the more exact pruning among the smaller branches and shoots of peach and nectarine trees, &c. These knives are generally made curving at the point, and they should not be too long, broad, and clumsy, but have rather a shortish narrow blade, and but very moderately hooked at the point, for when too crooked they are apt to hang in the wood, and not cut clean; it is also proper to be furnished with a strong thick-backed knife, to use by way of a chisel occasionally, in cutting out any hard stubborn stumps, &c., placing the edge on the wood, and with your nailing hammer striking the back of it, and it will readily cut through even and smooth. A long knife with a concave edge, and a pruning-knife with a convex edge, are also recommended by Mr. Forsyth.

Hand-pruning saws are likewise proper for cutting out any large branch too thick and stubborn for the knife: these should be of moderate sizes, one being quite small and narrow, in order to introduce it occasionally between the forks of the branches, to cut to exactness.

And as saws generally leave the cut rough, it is proper to smooth it with a knife or a pruning-chisel.

The pruning-chisels are necessary to use occasionally, both to cut off any thick hard branches and large hard knotty parts, or stumps, and to smooth cuts in large branches, &c., after a saw; they should be flat, and from about one to two inches broad: sometimes large strong chisels, fixed on a long pole, are used in pruning or lopping branches from the stems of high standard forest trees, one man holding the chisel against the branch, while another, with a large mallet or beetle, strikes the end of the pole. A hand-bill and hatchet are also necessary to use occasionally among larger kinds of the standard trees.—See TOOL.

All these pruning-tools, in their proper different sizes, may be had at the cutlery shops, and of the ironmongers, and many of the nursery and seedsmen.

PRUNUS, a genus containing plants of the fruit-tree, flowering and evergreen shrubby kind.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved perianth, bell-shaped, five-cleft, deciduous: segments blunt, concave: the corolla has five petals, roundish, concave, large, spreading, inserted into the calyx by their claws: the stamina have twenty to thirty awl-shaped filaments, almost the length of the corolla, inserted into the calyx: anthers twin, short: the pistillum is a superior, roundish germ: style filiform, the length of the stamens: stigma orbicular: the pericarpium is a roundish drupe: the seed is a nut, roundish, compressed, with sutures a little prominent.

The species cultivated are: 1. *P. domestica*, Common Plum Tree; 2. *P. insititia*, The Bullace Plum Tree; 3. *P. Armeniaca*, Apricock or Apricot Tree; 4. *P. Cerasus*, Common or Cultivated Cherry Tree; 5. *P. Avium*, Small-fruited Cherry Tree; 6. *P. Padus*, Common Bird Cherry Tree; 7. *P. rubra*, Cornish Bird Cherry Tree; 8. *P. Virginiana*, Common American Bird Cherry Tree; 9. *P. Canadensis*, Canadian Bird Cherry Tree; 10. *P. Mahaleb*, Perfumed Cherry Tree; 11. *P. Caroliniana*, Evergreen Bird Cherry Tree; 12. *P. Lauro-cerasus*, Common Laurel; 13. *P. Lusitanica*, Portugal Laurel.

The first is a tree of a middling size, growing to the height of fifteen or twenty feet, branching into a moderately-spreading head: the leaves are on short petioles, which have one or two glands towards the end; they are slightly serrate and smooth; when young convoluted or coiled, and pubescent underneath: the peduncles short, commonly solitary: the calyx erect: the petals white, obovate: the drupe is an oblong spheroid, swelling a little more on one side and there grooved, of a blue colour, with a bloom on it: pulp yellowish, tender: the shell bony, ovate, pointed at both ends, and compressed: it loves a lofty exposure, and is a native of Asia and Europe. The cultivated garden Plums are all derived from this species.

The varieties of garden and orchard Plums are very numerous, differing in the form, taste, colour and substance of the fruit; but those mostly cultivated in this country are the following, according to Mr. Forsyth, and the times at which they ripen:

The Jaunhative, or White Primordian, which is a small plum, of a yellow colour, and mealy: it ripens in the latter end of July, or beginning of August: one tree of this sort will be sufficient for a garden of the common size. The Early Damask, which is commonly called the Morocco Plum, and which is middle-sized, and the flesh good: it ripens about the beginning of August, or sometimes a little later. The

Little Black Damask, which is a rich fruit, a good bearer, and becomes ripe about the latter end of August, or thereabouts. The Great Damask Violet of Tours, which is a fine rich plum of a blueish colour, and becomes ripe in August. The Red Orleans, which is large, of a rich juice, and becomes ripe in the latter end of August. The Fotheringham, which is an excellent plum, of a dark red, and the juice rich: there is hardly any plum that excels it, according to the opinion of some. The Blue Perdrigon, which is of a very good taste, and ripens in August. The White Perdrigon, which is a pretty good fruit, and has a sweetish taste mixed with tartness: it ripens in the beginning of September. The Red Imperial, or Red Bonum Magnum, which is a great bearer, and mostly used for baking: it is ripe about the latter end of September. The White Imperial Bonum Magnum, or Egg, White Holland, or Mogul, which is a large fruit, and, like the Red, mostly used for baking: it is a great bearer, and ripens about the beginning of October. The La Royale, which is a fine plum, equal to the Green Gage, but a shy bearer: it is of a red colour, and ripens in the latter end of September. The Little Queen Claudia, which is a small rich fruit, becoming ripe in September. The Large Queen Claudia, or Dauphiny, which is an excellent plum, of a yellowish green, and ripens about the beginning of October. The Green Gage, which is of an exquisite taste, and eats like a sweetmeat: its colour and size sufficiently distinguish it from any other: it ripens in August and September: it has several sub-varieties, all of which are of good qualities. The Drap d'Or, which is a good plum, and a plentiful bearer: it is ripe about the latter end of September. The Chester, which is rich, and a great bearer: it is ripe about the latter end of September. The Apricot, which is large and sweet, and is ripe in the beginning of October. The Maître Claud, which is a large round whitish plum: the juice is very brisk, though sweet: it is accounted among the best white plums that we have, and ripens about the beginning of October. The Myrobolanus, or Cherry Plum, which is a middle-sized sweet fruit, and ripens about the beginning of September: this plum is frequently planted for ornament, as it blossoms early. The La Mirabelle, which is of an amber colour, and small, but full of juice, and excellent for sweetmeats: it bears well, and becomes ripe about the beginning of September. The Brignole, which is esteemed the best plum of any for sweetmeats: the flesh is dry, but of a rich flavour: it is ripe about the latter end of September. The Red Diaper, which is large, and of a very high flavour: it

ripens about the beginning of September. The Saint Catharine, which is one of the best, and is much used for confectionary; it is also very good for the table, having a rich sweet juice; and is a good bearer, hanging the longest of any upon the tree: Mr. Forsyth says, he has had them in gathering six weeks: it ripens about the latter end of September. The Imperatrice, or Empress, which has an agreeable flower, and ripens about the middle of October: it is one of the latest plums, and should not be gathered till it begins to shrivel; it will then eat like a sweetmeat, and make a great addition to the table in the latter end of October and beginning of November. Monsieur's, or the Wentworth, which is a large fruit resembling the Bonum Magnum: it ripens about the beginning of October, and is good for preserving, but too sharp to be eaten raw. The Winesour, or Yorkshire, which is one of the best for preserving: it is ripe in October. The Damson, of which a fine large sort from Shropshire, raised from suckers or stones, is an abundant bearer, of a rich flavour, and good for baking or preserving: it ripens in the latter end of September, and continues till near the latter end of October to be good and fit for use.

To these Mr. Forsyth adds the following list: The Admirable, the Black Damascene, the Black Pear, the Blue Matchless, the Damas Noir de Tours, the Don Carloses, the Double-flowered, the Early Blue Primordian, the Early Red Primordian, the Early Amber, the Early Tours or Precoce de Tours, the Early Violet, the Early Orleans, the Fine Early Plum, the Jacinthe or Hyacinth, the Koa's Imperial, the La Prune Suisse, the La Prune Valeur Valentia, the Matchless, the Mageron, the Muscle, the Persian, the Red Queen Mother, the Royal Pea, the Royal Dauphin, the St. Julian, the Semina, the Small White Damascene, the Spanish Damascene, the Striped-leaved, the True Prune, the Verte-dock or Ver-dock, the Whitton or Nutmeg, the White Bullace, the White Orleans, the White Pear, the White Perdrigon.

The following sorts are recommended by the same writer as proper for a small garden: The Jaunhative, the Early Damask, the Orleans, the La Royale, the Green Gage in different sorts, the Drap d'Or, the Saint Catharine, and Imperatrice; the Magnum Bonum for baking; and the Winesour for preserving.

The second species is a tree which grows twelve or fifteen feet high or more: the branches are generally thorny: the leaves on short petioles, ovate attenuated at the base, serrate, villose underneath: the calyx is almost upright: the petals white, obovate: the drupe roundish.

The fruit is acid, but so tempered by sweetness and roughness as not to be unpleasant, especially after it is mellowed by frost. It is a native of Germany, flowering in April.

It varies with black, and white or rather wax-coloured fruit; and also with a red, bitter, unpleasant fruit.

The third is sufficiently distinguished by its broad roundish leaves drawn to a point at the end, smooth, glandular at the base in front, where they are sometimes slightly cordate, and unequal, that is, one side longer than the other: the edge is finely serrate: the petiole is from half an inch to an inch in length, commonly tinged with red: the vernant leaves convoluted, rolling upwards more or less; the leaves have a disposition to this at all times: the flowers are sessile, white tinged with the same dusky red that appears on the petioles: the fruit is round, yellow within and without, firmer than plums and most peaches, inclosing a smooth compressed stone, resembling that of the plum. It is a native of Asia.

There are many varieties of this; but the following are the most commonly cultivated, according to Mr. Forsyth: The Masculine, which is a small roundish fruit: it is the earliest of all the apricots, ripening about the latter end of July; and is chiefly esteemed for its tart taste: when fully ripe, it is of a red colour towards the sun, and of a greenish yellow on the other side. The Orange, which is pretty large, but rather dry and insipid, and fitter for tarts than for the table: it is of a deep yellow colour when ripe, which is about the latter end of August: this is considered as the best for preserving. The Algiers, which is a flatted-oval-shaped fruit, of a straw colour, juicy, and high-flavoured: it ripens about the middle of August. The Roman, which is larger than the Algiers, rounder, of a deep yellow, and not quite so juicy: it is ripe about the middle or latter end of August. The Turkey, which is larger, and of a deeper colour than the Roman; its shape more globular, and the flesh firmer and drier: it ripens about the latter end of August. The Breda, (brought from thence to England,) which is originally from Africa: it is large, round, and of a deep yellow colour; the flesh is soft and juicy: it is an excellent fruit, especially if ripened on a standard, becoming ripe about the latter end of August. The Brussels, which is held in very great esteem on account of its bearing so well on standards, or large dwarfs: it is of a middling size, red towards the sun, with many dark spots; and of a greenish yellow on the other side: it has a brisk flavour, is not liable to be greasy or doughy, and is preferred by many to the Breda; but when

the Breda is planted as a standard, the fruit is more juicy and of a richer flavour: it ripens in August on a wall, but not before the latter end of September on standards. The Moor-Park, called also Anson's, Temple's, and Dunmore's Breda, which is a fine fruit, and ripens about the latter end of August. The Peach, which was introduced from Paris, by his Grace the Duke of Northumberland, at Sion-house, in 1767: it is the finest and largest of all apricots, and is generally thought to be the same as the Moor-Park; but upon a minute examination the leaves will be found to differ: it ripens in August. The Black, which has been very lately introduced, by Sir Joseph Banks, from France, in which country it is highly esteemed. It is observed, that "the trees that Sir Joseph planted in his gardens at Spring Grove, near Hounslow, bore fruit last season, (1792) for the first time in this country; but, in consequence of the wet and unfavourable weather, it did not arrive at perfection. It ripens about the second week in August."

To the above list Mr. Forsyth has added the following: The Great Apricot, the Holland Apricot, the Provence Apricot, the Alberge, the Angoumoise, the Blotched-leaved, the Nancy Apricot, which has a fine large fruit; the Dutch Apricot, the Grover's Breda, the Persian, the Royal Orange, the Transparent, the Portugal Apricot, which has a small fruit.

The following are advised as proper for small gardens, in order to have regular successions of fruit: The Masculine, the Roman, the Orange, the Breda, and the Moor-Park.

The fourth species is a tree that has ash-coloured, shining, roundish branches: the leaves petioled, ovate or ovate-lanceolate, acuminate, unequally serrate, veined; the younger ones folded together flat, and more or less pubescent underneath: the stipules toothed, glandular: the umbels leafless, few-flowered, nodding: the calyx reflex: the petals white: the drupe red and acid. It differs from the plum in having the stone nearly globular, with the kernel of the same shape. It is a native of Asia and Europe.

It loves a sandy soil and an elevated situation.

The varieties are numerous; but the following are those most in cultivation, according to the above author: The Small May Cherry, which is the first ripe, and requires a good wall: one or two trees of this kind may be sufficient for a large garden: it is ripe in June. The May Duke, which comes in about the same time as the former, but is larger: it is an excellent cherry, and bears well against a wall. The Archduke, which, if permitted to ripen properly, is an excellent cherry: it becomes ripe

in June and July. The Hertfordshire Cherry, which is a sort of Heart, but firmer and of a finer flavour than Hearts in general: it does not ripen till the latter end of July, or beginning of August, which renders it the more valuable, as it succeeds more early Cherries. The Bleeding Heart, or Gascoign's, which is a very large cherry of a long form, and dark colour: it has a pleasant taste, and ripens in the latter end of July. The Harrison's Heart, which is a fine cherry: it was introduced from the East Indies by Governor Harrison, grandfather to the present Earl of Leicester, and first cultivated at his seat of Balls in Hertfordshire: some of the trees, Mr. Forsyth is informed, he presented to George the First; and they are at this time in a flourishing state, bearing fine fruit, in Kensington Gardens: it is ripe in July and August. The Black Heart, which is a fine cherry, but too well known to require any description. The Morello, or Milan, which is a very fine fruit when kept till the month of October, and makes a very great addition to the dessert at that time of the year: it is the best cherry that we have for preserving, and for making cherry-brandy. The Carnation, which takes its name from its colour, being red and white: it is a large round cherry, but not so sweet as the Duke Cherry: it ripens in the latter end of July. The Yellow Spanish, which is of an oval shape and amber colour, and is a sweet pleasant fruit: it is ripe in August and September. The Corone, or Coroun, which resembles the Black Heart, and which is an excellent fruit, and a good bearer, ripening about the beginning of August. The Lukeward, which comes in soon after the former, and is also a fine pleasant fruit, and a good bearer: it ripens in the beginning of August. The Graffion, which is supposed by many to be the same with Harrison's Heart; but, upon a close examination, Mr. Forsyth finds it to be a different cherry: its flesh is firmer and the stone flatter: it ripens in July and August. Ronalds's Large Black Heart, which was introduced into this country in the year 1794 from Circassia, is a fine large cherry, a great bearer, and valuable as a forcing sort: it is well worth cultivating, ripening in the beginning of July. The Fraser's Black Tartarian, which is a fine large fruit. The Fraser's White Tartarian, which is white and transparent. These cherries are excellent bearers, but particularly the Black kind: the fruit is of a fine brisk flavour, and they ripen early. The Luidie Gean, cultivated at Lord Viscount Duncan's, near Dundee, which is black, and almost as large as a Black-Heart Cherry: Mr. Forsyth says, "it is now common in the nurseries about Edinburgh; and

that Messrs. Gray and Wear have had it for some years in their nursery at Brompton-park." The Transparent Gean, which is a small delicious fruit.

To these the following list is subjoined: The Amber Heart; the Black Mazard; the Churchill's Heart; the Double-blossomed; the Flemish Heart; the Gross Goblet; the Holman's Duke; the Jeffrey's Royal; the Kensington Duke; the Large Spanish Cherry; the Late Large Morello; the Montmorency; the Ox Heart; the Purple Heart; the Red Heart; the Spanish Black; the South's Large Black; the Swedish Black Heart; the Tradescant's; the Turkey Heart; the Weeping; the Wentworth Heart; the White Heart.

The following are recommended as proper for a small garden: The May Duke; the Large Duke Cherry; the Archduke; the Black Heart; the Harrison's Heart; the Ox Heart; the Turkey Heart; and the Kensington Duke Cherry.

The fifth grows to be a large tree, fit for timber, and is frequently found growing as such in the woods. It is supposed to be a native of England.

The only varieties raised by seeds, from this, are the Black Coroun, and the Small Wild Cherry; of which there are two or three sub-varieties, differing in the size and colour of the fruit.

It is observed by the editor of Miller's Dictionary, that "the wild cherries are proper to plant in parks, because they grow to a large size and make beautiful trees. In spring, when they are in flower, they are very ornamental; the fruit is good food for birds; and the wood is very useful for turners. These trees thrive in poor land better than most other sorts. The French often plant them for avenues to their houses, on poor land; they also cultivate them in their woods, to cut for hoops; and the stones are generally sown for raising stocks, to graft or bud other Cherries upon, being of quicker growth and of longer duration." It is added that "the Garden Cherry grows only about fifteen or twenty feet high, whereas this attains forty or fifty feet in height, with a more erect and lofty head."

The sixth species rises to the height of ten or twelve feet, and, if permitted to stand, will have a trunk of nine or ten inches in diameter. The branches grow wide and scattering, and are covered with a purplish bark: the leaves ovate-lanceolate, alternate, slightly serrate: the flowers are in long loose bunches from the side of the branches: the petals white, much smaller than those of the Cherry: the flowers ranged alternately, each on a small pedicel: they have a strong scent, which is very disagreeable to most persons. They appear in May, and are suc-

ceded by small roundish fruit, at first green, afterwards red, but when ripe black; inclosing a roundish furrowed stone or nut, which ripens in August. It is a native of most parts of Europe.

It is commonly propagated in the nurseries as an ornamental tree or shrub, growing well in woods, groves or fields, but not in a moist soil. It bears lopping, and suffers the grass to grow under it. It is sometimes called the Cluster Cherry Tree.

The seventh rises with a straight upright stem more than twenty feet high: the branches are shorter, and closer together than those of the sixth sort, and naturally form a regular head: the leaves are shorter and broader, and not so rough: the flowers grow in closer shorter spikes, standing more erect: the fruit is larger, and red when ripe. It flowers a little later than the sixth sort, as in May and June; and the fruit ripens in August. It grows naturally in Armenia.

The eighth species rises with a thick stem from ten to thirty feet high, dividing into many branches, which have a dark purple bark: the leaves are ovate, alternate, on short footstalks, of a lucid green, slightly serrate, and continuing in verdure as late in the autumn as any of the deciduous trees: the fruit is larger than that of the preceding, is black when ripe, and is soon devoured by birds: the wood is beautifully veined with black and white, and polishes well. It is a native of Virginia and other parts of North America.

In the ninth the branches are even: the leaves less rigid than in the others, finely serrate, green on both sides, but manifestly villose to the touch, and ending in the petiole at the base. It is a native of North America.

The tenth species is a low crooked tree: the wood is red, very hard, and sweet-scented: the leaves wide and pointed, approaching to those of the wild pear: the flowers white: the fruit black, yielding a bitter purple juice, the stain of which is not easily effaced: the stone is smooth, round, and a little flattened on the sides; inclosing a bitter perfumed kernel. The birds are very fond of the fruit. It is a native of Germany, Switzerland, Austria, &c. flowering in April and May. Ray calls it Rock Cherry.

The eleventh is rather a shrub, if we judge from its growth in this climate: the stalk does not rise more than three feet high, but sends out lateral branches spreading on every side, covered with a brown bark: the leaves are alternate on very short footstalks, near two inches long and three-quarters of an inch broad, with small acute indentures on their edges; they are of a lucid green, continuing their verdure all

the year. It is a native of South Carolina, flowering in May.

The twelfth species is a shrub sending off long spreading branches, covered with a smooth brown bark: the leaves are elliptical or obovate, slightly serrate, alternate, upon strong, short foot-stalks: the flowers on short axillary peduncles: the calyx ovate; segments reflex, pointed: the petals small, white: the filaments about eighteen: the fruit resembling a black cherry, both in its external and internal structure. It differs from the Portugal sort in having the twigs and petioles green, whereas in that they are reddish brown. The leaves are of a yellowish green, whereas the green on the upper surface is very dark in that; they are also much wider in proportion and elliptical, but in that they are rather lanceolate; they are both toothed about the edge, but this more slightly, and the serratures of this are very harsh to the touch, as if they had prickles at the end: the veins are much more prominent at the back of the leaves in this; in that the leaves are commonly repand along the edge; but in this they are flat, except that the edge is a little bent back. The leaves in both are acuminate but end bluntly, and they generally bend down at the point. The young leaves are inclined to fold together upwards, like those of the Cherry, in this; but in that they are revolute, leaving a wide longitudinal hollow above: the old leaves are generally imperfect at the end, and in this are sometimes retuse or emarginate. The glands, which are obsolete, are placed on each side the midrib, about half an inch above the petiole. It flowers in April, and is a native of the Levant, of Caucasus, &c.

The thirteenth rises with a strong tree-like stem to the height of twenty feet or more, sending out many branches on every side, which have a shining purplish bark: the leaves are on short foot-stalks, of a lucid green, about three inches long, and an inch and half broad in the middle; they are sometimes slightly serrate, but generally entire: the flowers are produced in long bunches from the side of the branches, white, and shaped like those of the twelfth sort: the berries are oval, pulpy, at first green, then red, and when ripe very dark purple; smaller than those of the last sort and narrower at the end; enclosing an oval stone, like that of the Cherry, but more pointed at the top. It flowers in June; and is one of the most beautiful evergreen shrubs, having a fine appearance in long racemes of fine white flowers. It was introduced from Portugal.

Culture in the Plum Kind.—It is obvious that all the varieties were first obtained by seed, or

the stones of the fruit; and the approved kinds acquired in this manner were afterwards multiplied by grafting and budding; as they do not continue the same sorts from seed, for from the seed of one tree many different sorts may be produced, and probably none like the mother-tree, and very few that afford fruit worth eating: but when in possession of any approved sorts, they may be multiplied at pleasure, by ingrafting shoots or buds of them into any kind of Plum-stocks. Of course the mode of increasing these trees is, by grafting, budding, and occasionally by layers; but the two former are the most usual methods of practice.

The two first modes may be performed upon stocks of any sorts of the Plum-kind, which have been raised from the stones, sown in autumn in beds of good earth, about two inches deep; and when the plants are a year old, planted out in nursery rows two feet and a half asunder; when, after having from one to two or three years' growth, they are in a fit state for grafting or budding with the desired sorts; which is performed in the usual way, either low in the stock for dwarfs, or at several feet height for standards. See GRAFTING and INOCULATION.

These trees may be trained either as dwarf wall trees, espaliers, or as standards and half standards.

When the first shoots from the graft or bud are one year old, those of the trees designed as dwarfs for walls, &c. should be headed down within five or six inches of the bottom, particularly the budded trees, in order to force out laterals from the lower eyes, so as to furnish a proper set of branches, proceeding regularly from the bottom of the tree, to cover every part of the wall or espalier. With regard to the standards, their first shoots may either be suffered to run and branch in their own way, or headed to a few eyes, if it seem necessary, to force out lower laterals to give the head a more regular spreading form, afterwards letting them all take their own natural growth.

When the trees raised in either of these modes are from one to two or three years old, they are of a proper size for being finally planted out in the garden, or other place; though trees which are much older may be safely removed; but the younger they are planted where they are to remain, the sooner and more firmly they establish themselves, and form for bearing.

In the layer method, which is only practised occasionally, the business may be performed any time from November till March, choosing the last summer's shoots, and laying them down by *slit-laying*; when in one year they will be rooted, and must then be separated, and planted in nur-

very rows, being trained either for dwarfs or standards as may be required.

And the Double Blossom, the Striped varieties, and the Stoneless kind, are all increased by budding or grafting upon any kinds of Plum-stocks, either for dwarfs, or half or full standards.

The Bullace kinds are capable of being increased by sowing the berries or stones an inch deep in a bed of common earth in autumn; but to continue the different varieties distinct, they must be increased by budding, grafting, or laying, as in the other sorts.

The proper season for planting all the sorts of these trees is any time, in open weather, from November until March. And trees of all the varieties will mostly succeed in any common soil, and open exposure; but some of the best sorts should always be put for walls and espaliers, those for walls generally having an east or west aspect, or even a south wall for some of the choicest sorts; and a few may also be planted against a north wall, to furnish late fruit: and those for espaliers may be planted round any of the open quarters, as also the standards.

The trees designed for walls and espaliers should be planted out fifteen or eighteen feet distance; though where the walls, &c. are rather low, eighteen or twenty feet distance may be requisite, in order that, in default of a proper height of walling, there may be more scope to train the branches horizontally. But when the trees thus planted are quite young, as only of one year's shoot from the grafting or budding, they should in March be headed down, as above, to four or five eyes, to force out lower horizontals in the ensuing summer; which, according as they advance in length, should be trained horizontally at full length all summer, unless it be necessary to forward a further supply of lower branches as fast as possible; in which case, the young shoots should be pinched off in May down to a few eyes, when each will throw out several lateral branches the same year, which should also be trained horizontally at full length during their summer's growth; and in the winter pruning, cutting out only any foreright and back shoots, training-in all the regular ones at full length; as the branches of these trees should be shortened only occasionally to procure wood to fill vacancies, as the branches always form fruit-spurs first towards their extreme parts, which would be destroyed by shortening: so that, after having shortened the first and second year's shoots occasionally, as above, and thereby procured a proper set of lower horizontals, to give the head its first form; the whole may then be trained in entire about four, five, or six inches asunder; and, accordingly as the trees shoot, every sum-

mer training in a necessary supply of the regular shoots to fill the wall, &c. at the same time retrenching superfluities, and irregular and very rank luxuriant growths, training the supply of regular wood still at full length at the above distances; by which the trees will soon cover a large space, and the same unshortened branches continue bearing many years. See PRUNING.

The necessity of this sort of training is obvious from all the sorts bearing principally upon spurs, half an inch or an inch long, arising from the sides of the branches, of from one or two to many years old, which if shortened would throw out a multiplicity of useless wood, and hardly any fruit-spurs.

All the sorts of wall and espalier trees of this sort should be pruned twice every year, as in summer and winter, in order to retrench the superfluities of each year, and all foreright and other irregular shoots, and bad wood, and to train in a necessary portion of young wood where wanted to fill vacancies, or to supply the place of decayed, worn-out, and other bad branches. See PRUNING.

The standard-trees should be trained as full standards and half-standards, budding or grafting the former six feet high, and the latter only three or four; both kinds being worked low in the stock, training the first shoots to those heights for stems, then suffering them to branch and form heads: these may be planted out at from twenty to thirty feet distance, letting their heads form naturally.

Mr. Forsyth advises, that in choosing the trees the same directions should be observed as given below for apricots. "Clean straight plants, with single stems, should be employed, as those with two never make handsome trees on walls or standards, and the border should be managed as directed for apricots; digging the holes the same width and depth, and loosening the bottom: then fill up the holes with fine fresh loam, or the mould that was used the preceding year for melon and cucumber beds; being careful to keep the mould a proper height above the border, and the roots of the trees as near the surface as possible, spreading them horizontally. When there are any tap-roots, they should always," he says, "be cut off, as should also the fine hairy roots, as they are liable to get mouldy and rot, and thereby bring on a putrefaction of the mould about the root of the tree. When the roots are not spread near the surface of the ground, it will," he says, "prevent the sun and air from penetrating to them; and the fruit, of course, will not have so fine a flavour." He further advises "that the stems of young plum-trees should never be cut when first planted, but be left

till the buds begin to break, when they may be headed down to five or more eyes, always observing to leave an odd one for the leading shoot; always cutting sloping towards the wall, and as near to an eye as possible. Thus managed, the shoots will," he says, "soon fill the wall with fine wood. When it is found that some of the shoots are too luxuriant, they may have the tops pinched off with the finger and thumb, as above, about the beginning of June in the first year after planting; by doing which plenty of wood may be obtained to fill the bottom of the wall." He adds, that "a great deal depends on the first and second year's management of the trees."

With respect to the distance from each other at which Plum-trees should be planted against a wall, "it depends," he says, "on the height of the wall. If the wall be ten feet high, which is the common height, they may be planted at eight yards distance from tree to tree; but if the wall be twelve feet high, or more, seven yards will be sufficient." For his part, he prefers a wall of ten or twelve feet, which will, he thinks, be found high enough, if the branches are trained horizontally; by which means the trees will, he thinks, be much more fruitful, and not grow so luxuriantly. He further adds, that "by training an upright shoot on the Plums, as directed for Pears, fine kind shoots may be gotten from the sides. The leading shoot should be shortened, leaving it from one to two feet long, according to its strength. If the leading shoot be very strong, it may," he thinks, "be topped twice in the summer, as for Pears, and at the same time repeating the same every year till the wall is filled to the top." He would always recommend, where it is convenient, to allot one wall for Plums and another for Cherries, as they always thrive best by themselves, or when distinct.

As there will be Plum-trees to spare, that were planted between Pear-trees, when they begin to meet, these should, he says, be planted against another wall, or as dwarf standards. Those intended for standards should, he says, be prepared in the following manner: The year before they are to be planted they should be cut in the side-shoots at different lengths, from one foot to three, according to the size of the trees; suffering them to grow rude all the summer, neither nailing in nor cutting the side and foreright shoots. And some time during the winter the ground round their roots should be opened, cutting in the strong ones (which will cause them to put forth fine young fibres); then filling in the earth. In the following autumn, or during the winter (the sooner the better), they should be transplanted out as Standards. And in transplanting of the

trees, especially large ones, he considers it to be of great consequence that they be placed in the same position (that is, having the same parts facing the same points of the compass) as formerly. If notice be taken when a tree is cut down, it will, he says, be found that three parts in four of the growth are on the north side. When it is intended to plant them against a wall, they should never be cut in the side-shoots, but only the roots; by this method the trees will, he says, bear fruit the first year after transplanting, and there will be a great saving of time and money. He has often transplanted old Plum-trees that have been headed down that have made very fine roots, which he has divided, and thereby obtained four or five trees from one, cutting them so as to form them into fine heads. "Some that were transplanted in 1798 were in full blossom in 1799, producing some fruit, and in 1800 bearing a full crop."

It is recommended further by the same author, that "the ground in the borders and quarters where fresh trees are to be planted should be well trenched, two spits deep at least, to give the roots room to run into the fresh-stirred ground." And he says that when trees are planted without stirring the mould they seldom thrive well.

He advises that "when Plum-trees are planted for standards in an orchard which is to be kept for grass, they should be in rows at the distance of twenty yards from each other. If in the kitchen-garden for standards, he would always recommend the planting of dwarfs." The tree may be trained up to have a stem of about three feet high, at the distance of seventeen yards. "If the garden is laid out with cross-walks, or foot-paths, about three feet wide, the borders should be made six feet broad, planting the trees in the middle of them. In the royal gardens at Kensington, which are very long and narrow, and where the winds are very hurtful, he has, he says, planted two rows of apple-trees, intermixed with other fruit-trees, alternately, one row on each side of the middle walk (which runs the whole length of the garden), at the distance of seventeen yards from each other. He has also made cross-walks of three feet broad at the distance of seventy yards, with borders on each side six feet wide, having two rows of trees in each border, about twelve or fourteen feet asunder. These dwarf-trees are very useful in breaking the force of high winds, and are at the same time of such a height that a man standing on the ground may gather the fruit. As Plum-trees may be planted in the same manner and for the same purpose as the above, he can have the quarters clear for crops for the kitchen, and a free air be admitted, which

VOL. II.

can never be had where espaliers are planted: Dwarf Standards can, he says, be kept to what size you please; they look much handsomer than espaliers, and produce a greater quantity of fruit."

In regard to the method of managing and restoring old decayed trees of this sort, he remarks that he has restored "some of them which were so far decayed as to have only from one to two or three inches of bark left; they are now completely filled up with sound wood, with large heads, which at four years' growth filled a wall sixteen feet high, and are at this time full of fine fruit; some of the stems are several inches in circumference, bearing treble the crops produced by young trees that have been planted three times as long as they have been headed down. Where the trunks are become hollow, he always cuts out all the loose rotten parts, and also examines the roots, cutting off what is rotten, injured, or decayed. This method should, he says, be pursued with all hollow and decayed trees; and, if properly executed, they may be so completely filled up, as scarcely to leave a mark behind, even where the wood is totally decayed. He has had shoots from trees of this sort which have been headed, that have grown upwards of seven feet long, and as large as a walking-stick, in one summer: this should never be suffered; but they should be pinched off with the finger and thumb, in the beginning of June, close to an eye or a bud, unless the wall be filled to the top; in which case they should never be cut while they continue to bear handsome fruit. Before they begin to cease from bearing, you must always, he says, begin with shortening every other shoot, leaving them only from six inches to a foot long, and nail them in till the second year, taking care to rub off the superfluous and strong foreright shoots; by that time they will begin to bear: then cut out the others that have done bearing: by this method you will, he thinks, keep the trees in a flourishing state. When the branches are thus managed, they will frequently throw out small duggs, or foreright shoots, about an inch or two long, which will flower next year. They should never, he says, be shortened till after the fruit is set and become about the size of a large pea; by that time the leaves will have covered the fruit, and be able to protect it from the inclemency of the weather. You may now shorten these shoots close to the fruit, which will leave them from one to two inches long. This method he has practised with great success for several years. By leaving these short foreright shoots, the fruit is, he says, protected till it is out of danger of being killed by the

frost, or stunted by the cold north and north-west winds that happen about the latter end of March and beginning of April. The cold chilling rain and snow, which are also very injurious to the fruit, will be thrown off by the branches standing out from the trees. He by no means likes to see great spurs standing out from the wall; for they are always sure to be injured by the frost and cold winds. When the shoots are left naked, he has often seen the plums turn yellow, and drop after they have grown to a considerable size, from their being exposed to the cold frosty winds and rain. They should therefore, he thinks, in cold and frosty weather, be covered in the same manner as Apricots. Plums are, he remarks, more tender than any other sort of stone-fruit, owing to the flower-cup dropping sooner than that of peaches, nectarines, &c. And they are very liable to decay, after cutting off large limbs or branches, which always brings on the gum and canker, if it be left to Nature to perform the cure. He would, therefore, recommend the application of the Composition (in the same manner as directed for other sorts of fruit-trees) to every shoot where the knife touches, as soon as the trees are cut and nailed." And with the intention of having the fruit large and fine, care must be taken to thin it where it is too thick; but that must not be done too soon, lest it should be pinched by the cold. The fruit ought to be of the size of a small marble, and well sheltered by the leaves, before any attempt is made to do this." He advises never to pull off the leaves that shelter the fruit, till it is full-grown and begins to turn. See *AMYGDALUS*.

In conclusion it is also observed, that "he has taken up several old trees from the walls, when they have grown too near each other, and planted them out as standards, at the same time shortening their branches to form handsome heads, which are now full of fine fruit." These hints and directions are highly deserving of attention, as being the result of much practical experience.

Culture in the Apricot kind.—These trees are increased by budding them upon any kind of Plum-stocks, for which purpose they are raised from the stones of the fruit, sown in autumn in beds of light earth two inches deep; when they will come up the following spring, and in autumn or spring after be fit to plant out in nursery-rows; when in a year or two they will be fit to bud for dwarfs for walls, &c. but for half standards and full standards they must have three, four, or five years' growth, and be trained up with stems from three or four to six feet high; though sometimes the budding for

standards is performed low in the stock, and the first shoot trained up for a stem.

The operation of budding should be performed in August, being careful to procure shoots from which to take the buds from trees of the best sorts, performing the operation in the usual way. See *INOCULATION*.

The buds shoot in the following spring; at which time, before they begin to push, the stock should be headed down a little above the insertion of the bud; soon after which the buds will shoot and advance rapidly, and by autumn form a large shoot, and the trees are then proper for planting out for good, especially the dwarfs intended for wall-trees; or some may remain a year or two longer in the nursery, and be trained in a proper manner for planting against walls; and others for standards. But whether they remain in the nursery, or are planted out into the borders, the first shoot from the bud should in the March following be headed down to four or five eyes, to procure lower horizontal branches, as in the Plum.

When those intended for wall-trees are of one year's growth, with their first shoots or head entire, they are of a proper size for planting out finally where they are to remain. They may be planted out any time in open weather, from October until the beginning of March, choosing a south wall for the early and some other kinds, to come in forward; but as those exposed to the full south sun are apt to become soon mealy, it is proper to plant a principal supply against east and west walls.

Mr. Forsyth however thinks, "the best time for planting Apricots is in autumn, as soon as the leaf begins to fall. The person who goes to the nursery for the plants should, he says, make choice of those which have the strongest and cleanest stems; and if he can procure such as have been headed down, (to use the phrase of the nurserymen) of two or three years' growth, they will bear and fill the walls much sooner than those which have not been so treated. He should make choice of trees with one stem; or, if they have two, one of them should be cut off; for by planting those with two stems the middle of the tree is left naked, and, of course, one third of the wall remains uncovered." And though it is a practice with many to make choice of those with the smallest stems, he thinks they always make weaker shoots than the others.

These trees succeed in any common soil; they are usually planted in a range close along the wall, at eighteen feet distance, with their heads entire, which should be fastened either to the wall or to stout stakes, one to each tree, to pre-

serve them steady until spring, when they must have their first pruning, &c.

Mr. Forsyth however directs that, "if the borders wherein the trees are to be planted be new, they should be made two feet and a half or three feet deep, of good light fresh loam;" and that, "if the trees are to be planted in old borders, where the earth has been injured by the roots of the former trees, it will be necessary to take out the old mould at least three feet deep, and four feet wide, filling up the hole with fresh loam, taking care to plant the trees about eight inches higher than the level of the old border, to allow for the sinking of the earth, that they may not be too deep in the ground."

After being planted, if the trees are only one year old, with their first head from the bud entire, they should be headed down in the spring, to four or five eyes, to force out branches below; after which the trees should have water in dry weather, and the shoots from all the remaining eyes should in summer be nailed up regularly to the wall at their full length; and if any fore-right or back shoots come out, they should be rubbed off, being careful to continue the regular shoots to the wall all summer and the following winter; and in spring each shoot should be shortened to about eight, ten, or twelve inches, according to their strength, leaving the lowermost ones, on each side, rather the longest; this pruning short being still necessary in order to procure a further supply of lower branches, that every part of the wall may be occupied quite from the bottom; having particular attention to preserve nearly an equal number of branches arranging on each side of the tree, nailing them close to the wall horizontally, four, five, or six inches asunder. In the summer following, each horizontal branch will push out three or four, or more, new shoots, of which, if any rise fore-right and behind the branches, they should be rubbed off early in the season, nailing in all the regular side-shoots at full length during the summer, except it is necessary to pinch any particular shoot early to fill a vacancy. In the winter pruning, if there be any superfluities, or irregular growths left in summer, they should be cut out close, and all the regular-placed necessary shoots be shortened, though they should not now be pruned so short as in the two first years, only cutting each shoot according to its strength, from about eight or ten to fifteen or eighteen inches long: as the head of the tree is now tolerably well formed, therefore pruning only so as to obtain a further supply of wood, and a production of fruit; for as these trees bear princi-

pally upon the year-old wood, it is proper to train in a general supply of young shoots, of each year, in every part; the same shoots producing at the same time both a crop of fruit and a supply of wood for next year's bearing. The annual supply of wood must always, however, be shortened in the winter pruning; for if left entire it would produce only some shoots near the top, and leave the bottom naked, so as in a few years the whole tree would become very thin of bearing-wood below, and bear only a little towards the extreme parts of the branches. In the winter pruning, the shoots should always be shortened according to the strength of the tree and situation and strength of the respective shoots. And as these trees bear also upon short spurs, arising upon the two-years-old branches, it is proper to preserve them wherever they appear, only retrenching such as project considerably fore-right; leaving all those of one or two inches long, as the young shoots, of one year's growth, are the principal bearers: those produced one year bear fruit the next, and a general supply must be every year retained, and not shortened in summer, which would force out laterals from every eye, and spoil the shoots for next year's bearing; but in the winter pruning, a general shortening is necessary, and the whole tree should then be regularly nailed to the wall.

Mr. Forsyth says that, "when the trees are planted, they should by no means be headed down till the month of April or May, when they begin to throw out fresh shoots: strong trees should be cut a foot from the ground; and those that are weak, about half that length. But in backward seasons, they should not be headed down so early; never until the buds are fairly broken: always observing to cut sloping towards the wall, and as near to an eye as possible, that the young leading shoot may cover the cut; which operation should be again performed in the next March or April: the shoots that are then thrown out must be trained horizontally, to cover the wall: the number of these to be left ought to be from three to six on each side, according to the strength of the main shoot; taking care to rub off with the finger and thumb the fore-right shoots all over the tree, except a few which may be wanted to fill up the wall, near the body of it: and in the second year the horizontal shoots must be shortened in the same manner, according to their growth; and so on every year till the wall shall be completely covered from top to bottom." He adds that "it is a frequent practice with some gardeners, to head down the trees at the time of planting; which often proves fatal to them."

These trees must be pruned twice every year, as in summer and winter.

In the summer pruning, the irregularity of the numerous shoots should be reformed, beginning in May or early in June, and rubbing or cutting off close all fore-right and back shoots, and all superfluities or very rude growths; retaining, however, in every part, a full supply of the regular side-shoots, as succession-wood for the next year's bearing, training them in at full length, as above, to remain till the winter pruning; as it is of importance to leave more than a sufficiency of the well-placed shoots at this season, to have plenty in every part to choose from in the general winter pruning. See PRUNING.

In the winter pruning, a general reform should be made in all the branches and shoots, retrenching all worn-out and old naked branches ill-furnished with bearing-wood; at the same time selecting and retaining, in every part, the best shoots for next summer's bearing, cutting out close all the superfluous or unnecessary and ill-placed shoots, and reducing part of the former year's bearers and unfruitful old branches in every part of the tree, to make due room to train the necessary supply of young wood at proper distances; being careful, in retrenching the old wood occasionally, to prune it down either to a young shoot, or to some convenient branch it supports, which is furnished with one or more such shoots, so as every branch may also terminate in a young shoot for its leader, cutting off all the small shoots arising from the sides of the main ones, and letting the general supply of young wood in every part be now shortened moderately, according to their strength: the smaller shoots may be cut to about eight or ten inches, the middling ones to twelve or fifteen, and the strong shoots to eighteen inches or two feet long, pruning them generally to a wood-bud, in order to obtain a shoot at the end for a leader. All dead wood, cankered parts, decayed spurs, and stumps should be cut out; and as soon as one tree is pruned, let it be directly nailed, which should be performed with great regularity, training all the branches, &c. horizontally, as straight and close to the wall as possible, at equal distances. See PRUNING.

When these trees are of a strong vigorous growth, the shoots should be left thicker or more abundant than in moderate shooting trees, shortening them less in proportion, that by dividing the sap among many and a greater extent of branches, the luxuriancy may be restrained, as the more the strong young wood in a luxuriant tree is pruned, or the shoots short-

ened, the more vigorous the tree shoots, and produces little fruit. See AMYGDALUS.

The old trees should be well attended to in pruning, to continue them in a good fruitful state, by encouraging young wood in proper abundance; as by this care the trees not only more certainly produce crops, but the fruit generally ripens earlier, and has a peculiar richer vinous flavour. As these old trees are apt to run up naked below in the main branches, care should be taken when young wood advances in these parts, as well as in all vacant spaces, to preserve it so as to continue all the parts of the tree, from bottom upwards, regularly furnished with bearing wood.

In respect to old decayed trees, Mr. Forsyth says, "it has been the general practice to train wall-trees in the form of a fan, which occasions the sap to rise too freely to the top, leaving the lower part almost naked; so that scarcely one quarter of the wall is covered with bearing wood." He says that, "in that case, it will be necessary to cut down the whole of the tree, as near to the place where it was budded as possible, always cutting it at an eye or a joint: if there should be any young shoots on the lower part of the tree, it will be proper to leave them, training them horizontally, which will check the flow of the sap, and thereby render them much more fruitful." He adds that, "very frequently, when large branches have been cut off in a careless manner, and the wounds left to nature, the whole tree is infected with the gum and canker; which, if not checked, will in a short time totally ruin it: the best remedy in this case is, he thinks, carefully to pare off the cankered part of the bark with a draw-knife, or other convenient instrument. You will frequently find the white inner bark infected, which must also be cut away, till no appearance of infection remains; this may be easily known by the brown or black spots, like dots made with a pen, of which not one must be suffered to remain: all the branches so cut and pared should, he says, be immediately covered with the composition in a liquid state." And "as we sometimes see walls with all the trees infected, it will in that case be most prudent to cut every other tree, leaving the rest for a supply of fruit till those which are cut begin to bear; this will be in the second or third year: when trees are in a very bad condition, they should, he thinks, be cut in a partial manner, taking off the worst branches first, particularly those in the middle of the tree, always cutting as near to the graft as possible; or every other branch may at first be taken out, leaving the

rest to bear; by which means there will be a supply of fruit while the other parts of the tree are renovating: it should be remembered, however, that all the cankered bark must be cut off without loss of time; otherwise the new wood will be infected. Old trees thus headed down will, he says, sometimes throw out very strong and vigorous shoots, which it may be necessary to top, as it will cause them to throw out side-shoots, and soon fill up the wall with fine bearing wood; but they should never be suffered to have any fore-right spurs, except little dugs: the topping should be done in the beginning of June, which will cause the tree to produce fine bearing wood for the next year: those trees must be pruned in March following, shortening the shoots from fifteen to six inches, but according to their strength, always leaving the strongest shoots longest. And wherever the knife has been used, the Composition must, he says, be immediately applied."

It is also observed that, "after the fall of the leaf, it will be proper to unnaïl the young shoots, leaving only a few to prevent the tree from being broken by the wind. By this method they will be more exposed to the sun and air, which will ripen and harden the wood much more speedily than if they be left nailed." He adds that "he has a great dislike to autumnal pruning of fruit-trees, of all kinds of stone-fruit in particular; for by pruning at that season you seldom fail to bring on the canker: and no fruit-trees are more liable to this disease than the Apricot: the reason is obvious,—the great acidity in these trees, the exposure of the wounds, and the dormant state of the sap, predispose to mortification; whereas, in spring, when the sap is beginning to flow, and will follow the knife, the lips will quickly grow: if the branches are small, a fresh bark and fresh wood will in one season completely cover the wound; but if large, a time proportionate to their size will be occupied: this process, however, is manifestly much accelerated by the application of the composition, which excludes the air and wet from the air- and sap-vessels of the tree."

In regard to the standard-trees, they sometimes in favourable seasons bear plentifully, particularly the *Breda* and *Brussels Apricot*, either in half or full standards: the half standards are more out of the power of the winds and cold air.

These should be planted in a sheltered warm situation in the full sun, that they may have the greater chance of setting a good crop of fruit, and of ripening more effectually with a rich flavour: their culture is nearly the same as

that of other standard fruit-trees: they require but little pruning, only just to reduce or retrench any very irregular growth or out-growing rambler, or occasionally to regulate confused crowding branches, and to cut out decayed wood; all which should be performed generally in winter.

Covering and protecting the Blossom and young Fruit.—As trees of this kind planted against walls blossom very early, both blossom and young fruit are very liable to be injured by frosts and cutting blasts; it is therefore useful to afford occasional protection, in unfavourable seasons, to some of the forwardest and most valuable kinds, either with mats suspended over the trees, or twigs of evergreens stuck between the branches, beginning the covering as soon as the blossom begins to expand, and continuing it till the fruit is fairly set: the mats to be used only on nights and in bad weather, but the evergreens to remain constantly till all danger is past.

Mr. Forsyth remarks that, "in severe weather, they ought to be covered before the flowers begin to expand; for he has often seen the blossoms drop off before they opened: and he asserts that the best covering is old fish-nets, which should be put on three-fold; and if a few branches of dry fern are stuck in among the branches before the nets are put on, they will assist greatly in breaking the force of the high winds." The common practice of covering with mats in the night, and taking them off in the day, by frequently exposing the trees to the cutting winds, does, he thinks, more harm than good. And the covering with branches of spruce-fir and yew, by being too close, he supposes, encourages a blight, and causes the leaves of the trees to curl, and the shoots to break very weak; whereas the nets admit a free circulation of the air, and at the same time break the force of the wind: when it happens to rain or snow in the fore part of the night, and freeze towards the morning, the drops are, he says, found hanging in icicles on the meshes, while the tree is almost dry: when the shoots become pretty long, and the leaves expand to cover the fruit, it will be necessary, he says, to keep the net clear from the tree, by placing forked sticks, from six inches to a foot long, between it and the wall: this will prevent the shoots and leaves from growing through the net: the forked end of the sticks should rest against the meshes of the net. See *AMYGDALUS*.

Thinning out the Fruit.—In some seasons these trees set many more fruit than can attain perfection; and as they sometimes are placed very close, or often in clusters, and sit close to

the branches without any yielding footstalks, as in cherries, &c. they, in their advancing growth, must impoverish and thrust one another off; thinning becomes necessary, which in wall-trees particularly should not be omitted, and it is also proper occasionally in standards in some degree. This business should be begun when about the size of large cherries, &c. and should be done with great regularity, leaving the largest, fairest, and best situated to grow to maturity, mostly all singly, or at least never more than two at the same eye, but most commonly single in the large kinds. The fruit thinned off makes excellent tarts, and should always be saved for that purpose, and for which use they may be thinned by degrees, both in wall-trees and standards; but not, in the former, so as to leave the superabundant fruit to grow large in any considerable degree, nor in great quantity, to rob the continuing crop of its proper nourishment: for this use they should always be gathered before they stone, or harden in the heart or middle.

Forcing of Apricots.—In this method the fruit is obtained much more early than in the natural way, and is effected by having the trees in hot-houses, or on hot-walls, or in bark hot-beds.

The proper trees for this purpose are the dwarfs, trained as wall- or espalier-trees, but sometimes as small low standards: they are mostly trained in the full ground till advanced to some degree of bearing, and then planted in the borders of the forcing-house and hot-wall, and trained in the manner of wall-trees, to a light open treillis: some also, as small dwarf standards, placed forward in the former, or occasionally in pots, and introduced in the same situation; in all of which, the trees, being well fresh-footed in their places, are forced at the proper season by means either of fire-heat, or bark-bed, or sometimes both occasionally in forcing-houses, but in hot-walls mostly by the former: the forcing-houses and hot-walls have mostly flues for fire-heat, and sometimes the former have a pit for a bark-bed; but where this is not the case, the whole bottom space is formed of good earth, and the trees planted in are generally in assemblage with peaches, nectarines, plums, &c. as the same degree of heat is suitable to the whole.

The proper season to begin the work of forcing is principally in January, or early in the following month; when, or rather a little time before, the glasses are shut close; and at the proper time the fires made in the furnace moderately every evening and morning, to heat the flues in a proper degree, to afford a moderate

regular heat, to warm the internal air to a proper degree, which forwards the trees to early blossoming and fruiting; having fresh air moderately admitted in fine days, and more freely when there is a warm sun; being sometimes watered both in the earth, and over the branches after the blossom is past, and the fruit fairly set. See FORCING-FRAMES, &c.

Culture in the Cherry kind.—These are all increased by grafting, and budding them upon stocks of any of the cherry kind, raised from the stones of the fruit of any of the sorts; but for having larger-growing trees, for standards, walls, and espaliers, the most general stocks used are the Wild Black and Red Cherry, raised from the stones of the fruit: they, however, grow upon any sort of these stocks, and likewise take upon Plums, though these stocks are not proper for general use: they are also capable of growing upon laurel-stocks; which, however, is only practised for curiosity, suffering a small part of the stock to grow up to show the singularity of the two sorts growing upon the same root. All the varieties likewise take upon the Bird-Cherry stocks; but this should only be practised when it is required to dwarf any of them as much as possible; which in this way are proper to train for small dwarf trees, either to plant in pots, or in the open borders, and in pots for forcing, or to plant in the borders of a forcing-frame. See FORCING-FRAMES.

But, for general use, stocks either of any of the Common Cherry varieties; or, to have larger trees, the Wild Cherry-stocks, should be used, as being the freest shooters and of longest duration; though, in raising the stocks, it is from the stones of the fruit, which should be sown in autumn in beds of light earth, covering them near two inches deep: they come up in the spring, and in the autumn or spring following, if the plants are strong, plant them out in nursery-rows two feet and half asunder, to remain for grafting, &c. which, when about the size of a large goose-quill to that of a person's little finger, or little more, they are fit to work for dwarf trees; but for standards, they must have at least four years' growth, as they must be grafted at five or six feet height. And to have trees of more moderate growth either for walls, small standards, or dwarfs, the Morello and small May Cherry stocks may be proper.

The grafting and budding of all the sorts is performed in the usual way, though the former is most proper for general practice, as they are not so liable to gum in the grafted part as in that of the budded trees. Though both methods

may be occasionally used, and may be practised as the stocks occur in proper growth, &c. whip-grafting is the most proper in the most part, in this method of raising them: the budding is performed in the common way: the grafting should be done in the spring, as February and March, and the budding in summer, as June or July: the dwarfs should be grafted or budded near the ground, and the half and full standards from three to six feet high: the grafted trees shoot the same year, and the budded ones the spring following.

When the first shoots from the graft or bud are a year old, those of the dwarf sorts for walls, &c. must be shortened down in March or beginning of April, to five, six, or eight inches long, according to their strength; to procure lateral shoots to form the head, and the standards may be shortened or left entire as the case requires: when wanted to form a spreading head, the first shoots should be shortened to force out lower branches; after this, the branches of the dwarfs and standards remain mostly at their full length; and while the trees continue in the nursery, those designed for walls, &c. should be trained to stakes, in a proper position, occasionally pinching or pruning young shoots of the year early in summer, down to a few eyes or buds where necessary, in order to procure a production of lateral branches the same season, to train in for a further supply of young wood, to increase the expansion of the branches as soon as possible to continue entire.

When the trees have from one or two to five or six years' growth they are proper for being finally planted out; though, if planted when their heads are not more than two or three years old, they succeed much better than larger trees. Mr. Forsyth advises the same attention in choosing these trees, as for apricots, peaches, and nectarines, and that they should be headed down the first year.

The season for planting them out is any time in open weather, from the end of October or beginning of November till March.

The wall and espalier trees should be planted eighteen or twenty feet distant; and where the walls are tolerably high, a half or a full standard may be planted in the spaces between the dwarfs, that while these cover the bottom and middle, the standards may cover the upper part of the wall.

When those planted against walls or espaliers were planted when only one year old from the grafting, &c. with the first shoot from the graft or bud entire, they should be pruned short in March or beginning of April, to furnish lateral branches; but if they were headed in the nursery, and horizontal branches obtained, they

must not be shortened afterwards, except occasionally in particular shoots to fill a vacancy: as the fruit-spurs first rise towards the upper end of the branches, a general shortening would not only cut away the first fruitful parts, but force out a great deal of useless wood. The necessary branches, arising every year after the first heading down, should be trained horizontally at full length, five or six inches asunder; and where wood is wanted some adjacent young shoot may be pinched in May or early in June, or shortened in the spring following, when it will push forth two or three laterals; being careful to retrench all fore-right and other irregular-placed shoots, and continue training the regular branches still at full length at equal distances, till they have filled the proper space of walling or espalier.

In these trees the bearing-wood does not want renewing annually, the same branches continuing bearing several years, and only want renewing with young wood occasionally, as any branch becomes barren or an ill bearer, except in the Morello, which generally bears the most abundantly in the year-old young wood: a general successional supply of each year's shoots should therefore be retained for successional bearers.

The trees in all the sorts should be pruned twice every year; a summer pruning being given early in the season, to retrench all the superfluous shoots soon after they are produced, likewise all fore-right and other ill-placed shoots, and rank wood, as soon as possible; and to pinch shoots where wood is wanted, so as there may be as little pruning as possible upon the older wood, which is apt to gum by much cutting; retaining, however, a general moderate supply of the regular-placed shoots to choose from in the winter pruning, training the whole at full length: and in the winter pruning, examining the general branches, old and young, both in the former trained bearers, and the retained shoots of the preceding summer, retaining all the fruitful and regular placed former trained branches; and if, among these, any irregularity, disorderly or improper growths occur, the whole should be reformed by proper occasional pruning. In old trees, as well as others, it is proper to retrench any worn-out or declined naked branches, which are destitute of bearing-wood, or fruitful spurs, and to cut out all decayed wood; retaining a plentiful succession of last summer's young wood, in proper places, where necessary, to supply the place of any unserviceable old wood now retrenched; and at the same time cutting out all superfluous, or overabundant, and other unnecessary shoots reserved last summer, not now wanted, leaving only some well-placed ones, in any vacant spaces, or some in particular parts, to train in between

the main branches, to be advancing for bearers, ready to supply any deficiency; and generally a terminal shoot to the general branches in all parts where the allotted space admits of extending them in proper regularity: accordingly as each tree is thus pruned and regulated, the general branches and shoots should be trained in regularly, and nailed to the wall, &c. about three to four or five inches asunder, all at their full length, to the extent of their limited space.

Mr. Forsyth advises, in pruning these trees, never to shorten their shoots, as most of them produce the fruit at their extremities, the shortening, or cutting off of which very frequently occasions the death of the shoot, at least of a great part of it. The branches, therefore, should be trained at full length. He has often seen the whole tree killed by injudicious pruning. Wherever the knife is applied, it is sure to bring on the gum, and afterwards the canker; which will inevitably kill the tree, he says, if no remedy be applied to the wounds.

The Morello in particular, and the Small Early May Cherry, bear both on the young wood of last summer, the fruit blossom buds issuing immediately from the eyes of the shoots very abundantly, and upon small natural fruit-spurs arising on the two and three years' wood and continuing on the older branches; but generally bear the most plenteously on the young wood; and therefore it is necessary, both in the summer and winter pruning, to attend to this and retain a general supply of the young shoots of each year trained in plentifully in all parts of the tree in summer, of the most regular placed, as many as can be conveniently admitted with proper regularity: and in the winter-pruning, making a general selection of the best well placed shoots of last summer, to train in for successional bearers the ensuing season, cutting out the superabundant, with part of the naked former bearers occasionally to make room for the young supply, leaving a terminal one to each mother branch, and thus train in the general branches and shoots horizontally, about three or four inches asunder, all at their natural length.

The Standard Cherry-trees should be planted twenty-one feet distance at least; but if for a whole orchard, twenty-four feet, or eight yards distant every way, will be requisite. The first shoots having been previously shortened in the nursery, if thought necessary to promote lower branches to form the head, plant them now with their heads entire, except just reducing any irregular growth, and suffer them to branch every way, and shoot in length as fast as they are able, not shortening any, and all the branches will soon form numerous fruit-spurs.

Little pruning is required for Standard Cher-

ries, as too much use of the knife, in the larger wood particularly, causes them to gum and canker; all that is necessary is, occasionally to retrench any very irregular growing branch, and all decayed wood.

In respect to old trees Mr. Forsyth says, "he has headed down a great many Cherry-trees which were almost past bearing, and so eaten up with the gum and canker, that what few Cherries they bore upon old cankered spurs were not fit to be sent to the table;" and that "in the years 1790 and 1791 he cut, or headed down, fifty trees. The operation was performed in the months of April and May in each year. These trees made shoots from three to five feet the same summer, bore fine cherries the next year, and have continued to bear good crops ever since: to the above trees he applied the Composition. At the same time he cut down twelve trees in the same row, but did not apply the Composition; these twelve trees all died in the second and third years after. They now, he says, gather more cherries from one tree where the Composition was applied, than they did from the whole number formerly; being also much finer and larger fruit. When Cherry-trees are very old, and much injured by large limbs having been cut off (which will, he says, infallibly bring on the canker and gum, and, if no remedy be applied, in a short time kill the trees); or if there are great spurs left standing a foot perhaps from the wall; the best way to bring them to have fine heads, and to cover the wall, is to head them down as low as possible, taking care to leave some small shoots, if there are any; if not, leave a bud or two at the ends of some of the shoots. Sometimes you will have a great difficulty to find any buds. If that be the case, in the spring, before you mean to head the trees, make some incisions in the branches. This should be done on different branches, at the most convenient places for filling the wall with good wood. The size of the incisions should be from one to two inches, according to the largeness of the branches; observing to make them just above the joint where the buds should come out. If you cut just below a joint, the shoot will die as far as the next bud or joint; and of course injure the tree, if no remedy be applied." He adds that "the time for performing this operation is in March, April, or May. But this "method of making incisions is only recommended where there are no young shoots or buds, and when the tree is in the last stage of the canker. Where you have a few young shoots, or buds, he advises to cut down the head as near to them as you can, and to take great care to cut out the canker till you come to the sound bark. The canker makes its appearance in these trees in the same

manner as in peaches and nectarines, and may be easily discovered by an attentive observer. "If any gum remains, it must, he says, be cut or scraped off; the best time for doing which is when it is moistened with rain; you can then scrape it off easily without bruising the bark. This operation is very necessary; and if it be neglected the disease will increase rapidly." And wherever the bark or branches have been cut off, the edges should be rounded, and the Composition applied.

It is observed that the general way of pruning these trees has been to leave great spurs, which continue to increase till they stand upwards of a foot from the wall, and become as thick as a man's arm: but it must be observed, that cutting off from year to year the shoots that are produced from the spurs, increases the canker, till large protuberances, like wens, are formed on the branches, becoming very unsightly; and these occasion them to produce only small and ill-flavoured fruit at a great distance from each other. When this is the case, the method he pursues is, to head the trees down as before directed.

And if the young shoots are properly trained, they will, he says, produce fruit the following year; and in the second year produce more and finer fruit than a young tree that has been planted ten or twelve years.

The same writer remarks, that "it has been a general complaint, that Heart Cherries are bad bearers when trained up as wall-trees; but by pruning them as Duke Cherries, he has brought them to bear in the same manner; that is, he leaves a great many fore-right shoots in summer, tucking them in with some small rods run across under the adjoining branches, to keep them close to the wall, and prevent them from being broken by the wind, and from looking unsightly. He advises, "never to make use of the knife in summer, if it be possible to avoid it, as the shoots die from the place where they are cut, leaving ugly dead stulps, which will infallibly bring on the canker. These shoots may be cut in the spring to about a couple of eyes, as Duke Cherries, which will form a number of flower-buds."

Mr. Forsyth well observes, that "as Cherries are a very considerable article of traffic in the London markets, and the markets of most towns throughout the kingdom, employing such a great number of people during the summer season in gathering, carrying to market, and selling them, the raising of them is certainly worth any gentleman's while, especially as the trees may be rendered ornamental as well as profitable, by planting them in shrubberies, &c.

Vol. II.

Gentlemen of small fortunes, who are at a great expense with their gardens and plantations, may, he says, in a great measure reimburse themselves by selling their cherries and other fruit (for which there will be plenty of chapmen), and thus enjoy at an easy rate the pleasures of a rational and useful recreation." And he adds, that "in all parts of the country, there are persons employed in collecting fruit for the markets, and to hawk it about from place to place; and surely it is much better to sell it to them, than to let it rot on the ground, or be devoured by birds and insects."

It is advised, "when Cherry-trees begin to produce spurs, to cut out every other shoot to make the tree throw out fresh wood: when that comes into a bearing state, which will be in the following year, to cut out the old branches that remain; by that method you will be able to keep the trees in a constant state of bearing, taking the same method as before directed with the foreright shoots. And great care should, he says, be taken to rub off many of them in the month of May, leaving only such a number as you think will fill the tree. By so doing your trees will continue in a fine healthy state, and not be in the least weakened by bearing a plentiful crop of fruit. The reason is obvious: the great exhalation which would be occasioned by the sun and air in the common mode of pruning is prevented, by the Composition keeping in the sap which nourishes the branches and fruit."

He adds, that he "cut some trees, as directed above, more than twelve years ago, that are now in as good a state of bearing as they were in the third year after the operation, and likely to continue so for many years."

He states that "a row of Dwarf Cherry-trees that stood against an old paling, with an old thorn hedge at the back of it, (which every year so infected them with a blight, accompanied by an immense number of caterpillars and other insects, that even in a fine year they could not gather eight baskets from the whole row) became so fruitful after the hedge and paling were removed, that they gathered forty-two pounds a-day for six successive weeks, besides what the birds, wasps, and flies destroyed. He mentions the fact to stimulate market-gardeners and farmers, who have large orchards and gardens, to exert themselves in trying every method, however unimportant it may at first appear, to improve and render them more fruitful, and concludes, that the Duke and Heart Cherries from these trees were as fine as any that were produced from wall-trees. And, as they are much more productive, he has been induced

to take up many old renovated trees from the walls, and plant them out for dwarf standards, supplying their places with pears, plums, peaches, &c." And further he says, that "in all old gardens and orchards throughout the kingdom, and particularly Kent, whence the London markets are chiefly supplied with Cherries, the greater part of the old trees will hardly bear fruit sufficient to pay the expense of gathering it; but if the above method of pruning, &c., were practised, the owner would soon find his account in it, and be amply repaid for his trouble: the fruit would be much finer, and he would have five times the quantity that the trees produce in their present condition; the trees would be more sightly, and always keep in a flourishing and bearing state: but when old standard Cherry-trees become decayed and hollow, he would recommend heading them down, as directed for wall-trees and dwarfs, to scoop out all the rotten, loose, and decayed parts of the trunk, till you come to the solid wood, leaving the surface smooth; then use the Composition."

Forcing of Cherries.—This sort of tree may likewise be forced by artificial heat, in houses, so as to obtain fruit at an early season, as in April and beginning of May. And for this purpose the earliest Dukes and May Cherry are the proper sorts, but principally the former; trained both in standards, of four, five, or six feet stems, to elevate the heads near the top glasses of the forcing-house, which are generally pruned to a small compass for that purpose; and in dwarf standards, with short stems and low heads: both of which, for this use, should be such as are previously trained in the full ground, till the heads are of three, four, or five years' growth, or till they have commenced bearers in some tolerable degree. The forcing-houses for this use are of different constructions, according to circumstances, and the other purposes to which they are applied. They have proper flues for fire heat, and mostly internal borders of good earth, either in the back part for the taller trees, and in the front for lower; or sometimes, where no internal bark-pit is made, for bark-bed heat: the forcing being effected wholly by fire, the whole bottom space is entirely formed into a bed of earth of proper depth, and the trees planted in it in rows from the back to the front, in some regular gradation according to their height; sometimes with dwarfs planted between the taller standards, and towards the front; and occasionally with dwarf trees in pots.

In this sort of forcing, a very slight degree of fire-heat is sufficient; therefore when there are

back flues they need not be employed, only that in the front being used.

The author of the *Scotch Forcing Gardener* observes, that where "the situation is dry, the bottom a kindly sand, gravel, or clay, and the soil a sandy loam to the depth of two feet; the border will require no other preparation than being well enriched with stable dung, and if possible a little marle, which ought to be trenched and well mixed twice or thrice during the summer before planting. But, where it is wet, the bottom a cankering gravel or cold clay, and the soil either a poor sand, gravel, or stubborn clay, care must, he says, be taken to render them otherwise, by paving the border to the breadth of twelve or fourteen feet, running a drain in front to carry off the wet, and removing the bad, and bringing in good soil; so as to compose a rich sandy loam to the depth of thirty inches at the wall, and twenty-four in front, allowing three or four inches for settling. If a new building is erecting for Cherries, it is immaterial, he thinks, whether the building or border is completed first, (providing the latter has a sufficient time allowed for the mixing and incorporation of the soil) as the front wall and flue stand on pillars, whose foundations ought to be at least six inches deeper (if the border is not paved) than the soil."

He considers "about the first of January to be a good time for planting; although a month sooner or later at this season is of little consequence, as there must be no fire-heat applied the first year. Having provided the necessary number of healthy, well-rooted, maiden, or one-year-trained May Dukes; as experience, he says, shows that no other Cherry deserves a place in a forcing-house, let them be planted against the trellis at the distance of eight, nine, or ten feet, according as the length of the house will best divide; filling-in the pits with vegetable mould from decayed tree leaves, and settling all with a little water. Riders, with five or six feet boles, which have been trained two or three years against a wall, and have produced a crop or two, should be provided to fill the upper part of the trellis, where they will yield a few crops before the dwarfs require their removal. These will generally produce a few fruit the first, and be sure to produce a full crop the second year."

The surface of the border should, he says, be forked over once a year, and a little well rotted dung occasionally worked into it.

In respect to the trees, he observes, that "the dwarfs or principals being the only ones intended ultimately to fill the trellis, the riders being planted solely for the purpose of obtaining

a crop or two while those are making their wood and forming their fruit spurs, and, by being checked by their removal, may not be expected to put forth much young wood while they remain there, it will be unnecessary in pruning to thin them out much, only let them be dressed regularly to the trellis, and (where not absolutely requisite) divesting them of any shoots they may make, paying respect to their fruit-spurs only; as when they have served this purpose they will be of no further use."

He says, that "after planting, the dwarfs, if maiden trees, should be headed down to two or three eyes, in order to make them put forth vigorous shoots, to furnish the trellis from the bottom: and, if they have been one year in training, the bottom branches should be laid well down, and the rest dressed in a regular manner to the trellis, using strings of fresh matting to tie with; and be careful to allow sufficient room in the ties, as much mischief is done to fruit, especially Cherry-trees, (which are so apt to gum) if not allowed a sufficiency of room. He makes it a rule to allow every shoot as much room in the shred, or tie, as will at least admit another of the same size along with it."

As these trees are "apt to gum, and the branches decay, from the slightest injury, it would be imprudent to train them horizontally; in which case, the loss of a branch is supplied with much more difficulty than when trained in the fan manner." This last method he therefore recommends. And "when the tree has produced its shoots to the length of five or six inches, they should be gone over and thinned, so as to enable the operator to lay them in at about the distance of ten or twelve inches; pinching off any that are produced fore-right, and which are, from their appearance, not forming for fruit-spurs; and, as they advance, let them be neatly laid in, and divested of any laterals they may produce. If all has gone well, at the end of the first year they will, he says, have produced shoots from twelve to thirty inches long, which should then be shortened to about two-thirds of their length. In the second season they will shoot vigorously, and begin to form many fruit-spurs on the preceding year's wood, which must be encouraged, for the production of a few fruit the following year. The trees should be kept clear of all superfluous and lateral shoots, laying the leading ones at the distance of eight or nine inches; and, at the end of the season, shortening a few of the strongest alternately, so as to make them break their buds in the spring in a regular manner; as they will not require to be any more shortened.

And in the third season, they will, he says, produce a few fruit, make fine spurs and moderate shoots; which, as they advance to the riders, room should be given, by lepping off their branches, or thinning away their foliage, so as to afford a free circulation of air and admission of sun. In the fourth season, they will produce a full crop of fruit; and often make such a progress towards the riders, that their presence becomes unnecessary; in which case, it will, he says, be advisable to sacrifice whatever fruit, or appearance thereof, there may be on them, to the encouragement of the principals. After the trees have filled their spaces, and have begun to produce plentiful crops of fruit, they will make little or no wood; and will require no further care, on the score of training, than to supply the place of any branch that from accident may die out or be destroyed."

These trees, from their nature, bear very little artificial (especially fire) heat, on which account he would not advise the forcing of them too early, especially if there be no more than one compartment for their culture; since, in that case, there would not be a continued succession for the supply of the table, and furnishing a dessert, till they came in on the open walls. He considers the first or middle of February to be an eligible time for the commencement of the forcing; but, in a new planted house, the third year ought to arrive before fire heat is applied. Were it not for the sake of other articles that may be placed or planted in the Cherry-house, it would, he thinks, be better that the glasses were not put on the first season at all; but this is generally too great a sacrifice: however, if they are put on, a free circulation of fresh air, even in the night, ought to be encouraged. When in the third year after planting, the trees have made good progress, plenty of fruit-spurs, and a reasonable hope of success is entertained, the glasses should be put on about the middle of January, plenty of air being admitted through the day, shutting them up at night. On the first of February the fire may be lighted, which must, he says, be made so moderate, that, at eight at night, and eight in the morning, Fahrenheit's thermometer may not stand above 40°. In which condition it should be kept as near as possible till about the twentieth of the month; and then increased gradually to 45°: at which point endeavour to keep it till the fruit is fairly set. Afterwards increase the heat to 50°, but not more, till the stoning is over, and the fruit are begun their second swelling. Although, for the sake of the fruit, all danger is then past; yet, if too strong a fire heat is indulged in, it will, he says, have the tendency of

drawing the shoots too weak: and therefore he would not advise that the air of the house, at the fore-mentioned hours, should ever pass 60°.

With regard to the admission of air, he says, "the house ought to be uncovered all the first season after planting: but, if this is not the case; and if, from the nature of what other plants are placed therein, it is imprudent to leave a little air in the house in the night, it should be opened by sun-rise in the morning, having a large and free circulation all day, shutting it up at sun-set. However, when the month of May arrives, it ought, he thinks, to be entirely uncovered. In the second season, he advises, that the glasses be put on by the first of March, large portions of air being admitted, as directed above, and the glasses be removed by the first of August. From the commencement of the forcing, this article must, he says, be more particularly attended to; the first ten days after which, a very large share of air should be given, to prevent the buds from breaking too suddenly, and of consequence too weakly: besides, vegetation (in forcing) ought always to be brought on, as it were, by stealth: the juices flow more kindly; and the plant suffers the first impulse of reviving activity with more patience, than when hurried on in a violent manner. But, after the buds begin to appear turgid, a more moderate quantity may be admitted; still having respect to the temperature of the house, and the prevention of frosty winds from hurting the bloom." At all events, "advantage should be taken of sun-shine; which will allow a larger portion than at other times. Nevertheless, let no day pass (unless a severe frost) wherein less or more air is not admitted; and, in sun-shine, to the extent that the thermometer may not rise more than 10 degrees above the fire-heat medium. After the crop is all gathered, if consistent with the welfare of the other articles contained in the house, the glasses should be removed, and the trees exposed to the weather till the next season.

"When planted, the mould should be settled to the roots of the trees by a moderate watering; and if the house remain uncovered the first season, little attention (except in dry weather) will be required. Due attention should be paid the second year to keep the border in a moderately moist state, that the plants may grow freely; and when their growth is stopt for the season, withhold the water, that the wood may ripen perfectly before they are exposed to the weather. From the time the forcing is begun, plentiful waterings should be given to the border, until the bloom begins to open; and then in a moderate degree till the fruit is fairly

set. After which, again increase the quantity till the fruit begins to colour; and then diminish the quantity by degrees till you entirely withhold it, which ought to be done some time previous to the fruit's being ripe." It is also observed, that "washing with the hand-engine should commence with the day the fire is lighted; and, except from the time the bloom begins to appear till the fruit is fairly set, should be repeated thrice a week in the evening, and that with a considerable degree of force, till the fruit begins to ripen. And in the interval of washing, (viz. while in bloom, and till the fruit is set) a little water should be poured on the flue every evening when the fire is at the strongest, which causes a fine agreeable steam to arise in the house, greatly to the benefit of the flowers and foliage. Soft and tempered water should be used at all times, and on all occasions."

With respect to the insects that infest the Cherry House, they are, "the aphid, or green fly; the acarus, or red spider; the caterpillar, and the grub. The first, and least hurtful, is easily destroyed by a fumigation of tobacco. The second, by the process of washing with the engine, which is indispensably necessary to the health and vigour of the trees. Therefore, when they begin to make their appearance at any time, the water, in the ordinary course of washing, should be thrown against the trees with greater force, making a point of beginning at the contrary end of the house each time; whereby, if you happen to miss any part the one way, you may strike it the other. The caterpillar and grub have, he says, given him more trouble than the preceding, or indeed any species of insect whatever; and, after trying a variety of prescriptions, being at much trouble and expense, he can venture to assure the reader, and the public, he has at last discovered a cure", which is as follows:

"Take of soft soap, two pounds; flowers of sulphur, two pounds; leaf, or roll tobacco, one pound; nux vomica, two ounces; and oil of turpentine, a gill: boil them all together in eight gallons of soft or river water to six; and set the liquor aside for use. And any time in winter, at least a considerable time before the trees begin to vegetate, let them be all untied or unnailed the trellis or wall; brush every part of the branches and buds clean with a soft brush, such as is used for painting: make the liquor milk-warm; and, with a sponge, carefully anoint every part of the tree, trellis, &c. Dress the trees neatly to the trellis again; but use none of the old ties or shreds: and let this operation be repeated every winter. The first summer after

anointing, there may, he says, be a few appear, whose eggs have, by being concealed, escaped the action of the liquor, which must be picked off, to prevent their breeding; but, if any, there will be very few, as it is of the most penetrating nature." But this liquor must on no account, he says, be used in summer, as it instantly destroys the foliage. Fruit-trees of all kinds should be anointed with this liquor every year; as it is, he says, equally destructive of every insect and their eggs, which infest them.

In cultivating Dwarf trees, in pots or boxes, it is observed, that "where there is an extensive variety of forcing, and a green-house, or conservatory, Cherries may not only be produced at an early season, but in a long succession, by removing the pots or boxes from one house to another. When there are twenty or thirty trees, they should be divided into four or five equal parts, to make as many successions; and be placed in equal rotation: first, (in November or December) in the green-house, where they may remain till they are fairly set; then, in an early peach- or vine-house, till they begin to colour; and lastly, in the pine or dry stove, to come to maturity. And a very rich compost, such as is used for cucumbers or melons, should be made use of, watering them frequently with the drainings of a dung-dill. They should also be washed or watered frequently over head with a hand squirt or watering pan; and be placed in the most airy situations."

The Double-blossomed sort may likewise be increased by grafting or budding, as in the other varieties, upon any kind of Cherry-stocks, and be trained both as dwarfs, half and full standards, to effect the greater variety in plantations and other places.

And the Wild Cherry is easily raised from seed, as the stones of the fruit; and any variety which affords large and fine fruit may be continued by grafting, &c., in which way it will bear sooner, for which a quantity of stones should be provided in autumn, when the fruit is dead ripe, and be sown in beds of light earth an inch and a half deep, when they will come up in the spring, and after having one or two years' growth may be planted out in nursery-rows, with their tops entire, training them up for standards, with stems six feet high, then letting them branch out above every way, to form heads.

They may be planted out as standards in orchards or any open grounds for the fruit, and in ornamental plantations of forest-trees, where they have a good effect.

The Bird-Cherry sorts may also be increased

in the same manner, and likewise by layers, which will readily strike root, and be fit for planting out in one year. They will also grow well by cuttings planted in autumn.

And the last sort is capable of being raised by grafting, and sometimes by layers.

Culture in the Laurel kind.—These are readily increased by seed and cuttings: but as cuttings are the most expeditious mode, they are most commonly raised in that way.

In the first mode, the seeds should be sown in autumn, when ripe, in beds of light earth, near an inch deep, allowing them some protection in severe frosts in winter, either by hooping and matting the bed, or covering it with dry long litter; but suffering them to remain uncovered in mild weather. The plants come up in the spring, giving occasional waterings in dry weather; and in the autumn or spring following, when the season is settled, planting them out in nursery-rows to remain two or three years, or till wanted.

The cuttings should be procured in August or September, in moist weather, from the same year's shoots, cutting them off from about eight or ten to twelve or fifteen inches long, with about an inch of the old wood to the bottom of each, if possible, though this is not indispensably necessary: then strip off the leaves from the lower parts, and plant them in a shady border, in rows, twelve inches asunder, planting each cutting half or two-thirds into the ground, giving water in dry weather, when those planted in August will be rooted the same year; and all in the following summer, shooting at top, perhaps a foot long, by the autumn; at which time, or in the spring after, they may be planted or bedded out in wide nursery-rows, to acquire strength, till wanted. In either of these methods the trees may be trained either bushy or of a shrub-like growth, or trimmed up to a single stem for standards.

These plants delight in a light loamy soil, which is not too moist.

The proper season for planting them out is in the early autumn or spring, according to the soil.

They are highly ornamental in clumps and plantations, in lawns, parks, or out-grounds.

Hedges are sometimes formed of the common laurel for ornament; but where this is practised it should not be trimmed with garden-shears, which mangle and spoil the beauty of the large leaves: all necessary cutting should be performed with a knife, in order to preserve the leaves entire, so as to make a fine appearance.

PSIDIUM, a genus containing plants of the exotic tree kind.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Hesperideæ*.

The characters are: that the calyx is a one-leaved perianth, bell-shaped, five-cleft, permanent: segments ovate: the corolla has five ovate petals, concave, spreading, inserted into the calyx: the stamina have numerous filaments, shorter than the corolla, inserted into the calyx: anthers small: the pistillum is a roundish germ, inferior: style awl-shaped, very long: stigma simple: the pericarpium is an oval berry, very large, crowned with the calyx, one- or many-celled; the seeds numerous, very small, and nestling.

The species cultivated are: 1. *P. pyriferum*, White Guava; 2. *P. pomiferum*, Red Guava.

The first, in its wild state, grows to the height of seven or eight, sometimes of twelve feet, but in the state of cultivation, where the soil is good, it equals a middle-sized apple-tree, the trunk being six feet in height, and a foot and half in circumference: the bark is smoothish, of a yellowish brown colour, with large ash-coloured spots: the wood very hard and tough, used for ox-yokes and the like purposes, and well adapted for fuel: the branches numerous, the young ones four-cornered: the leaves blunt, entire, smoothish, on short petioles, two or three inches long, opposite: the peduncles are solitary, short, supporting a white sweet-smelling flower: the fruit smooth, having a peculiar smell, yellow, sulphureous, or whitish on the outside, roundish or more oblong, the size of a hen's egg or bigger, according to the soil: the rind is a line or two in thickness, brittle and fleshy; pulp rather firm, full of bony seeds, flesh-coloured, sweet, aromatic and pleasant. It is a native both of the West and East Indies.

This fruit is eaten with avidity by the natives, and also sometimes preserved with sugar.

The second species has a pretty thick trunk, twenty feet in height, covered with a smooth bark, and dividing into many angular branches towards the top: the leaves are two inches and a half long, and one inch and a half broad in the middle, rounded at both ends, having a strong midrib and many veins running towards the sides, of a light green colour, opposite on very short foot-stalks: the peduncles are axillary, an inch and a half long: the petals are large and white; the fruit shaped like a pomegranate, crowned, when ripe having an agreeable odour. It is a native of the West and East Indies.

Culture.—These plants are increased by seeds, which must be procured from the countries where they grow naturally; and when these are brought over in the entire fruit, gathered full

ripe, they succeed with greater certainty: they should be sown in pots filled with rich kitchen-garden earth, plunging them into a hot-bed of tanners bark, giving them water from time to time, as the earth dries. When the plants come up, they must have free air admitted to them in proportion to the warmth of the season; and, when they have attained strength enough to be removed, be each planted out in a small pot, filled with the same sort of earth, and be plunged into a fresh hot-bed, shading them from the sun until they have taken new root, when they should have a large share of free air admitted to them every day in warm weather, to prevent their drawing up weak; they must also be frequently refreshed with water in summer.

When they have filled these small pots with their roots, they should be shaken out and their roots pared, putting them into larger pots filled with the same sort of earth, and replunged into the hot-bed, where they should remain till autumn, when they must be plunged into the tan-bed in the stove: during the winter they should have moderate warmth, and not too much water, and in summer have plenty of moisture, and in hot weather a great share of air.

They afford ornament among other stove plants.

PSORALEA, a genus comprising plants of the shrubby exotic kind for the greenhouse and stove.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianthium, dotted with tubercles, five-cleft: segments acute, equal, permanent; the lowest double the length of the others: the corolla papilionaceous, five-petalled: standard roundish, emarginate, rising: wings crescent-shaped, blunt, small: keel two-petalled, crescent-shaped, blunt: the stamina have diadelphous filaments, (one single and bristle-shaped, nine united), ascending: anthers roundish: the pistillum is a linear germ: style awl-shaped, ascending, the length of the stamens: stigma blunt: the pericarpium is a legume the length of the calyx, compressed, ascending, acuminate: the seed single, kidney-form.

The species cultivated are; 1. *P. pinnata*, Winged-leaved Psoralea; 2. *P. aculeata*, Prickly Psoralea; 3. *P. bracteata*, Oval-spiked Psoralea; 4. *P. hirta*, Hairy Psoralea; 5. *P. bituminosa*, Bituminous Psoralea; 6. *P. Americana*, American Psoralea; 7. *P. corylifolia*, Hazel-nut-leaved Psoralea; 8. *P. Dalea*, Annual Psoralea.

The first rises with a soft shrubby stalk, four or five feet high, dividing into several branches:

the leaves are of a deep green colour, composed of three or four pairs of very narrow leaflets, terminated by an odd one, standing upon short footstalks, and coming out without order on every side of the branches: the flowers sit very close to the branches, and are often in clusters: the standard, which is erect and reflexed at the top, is of a fine blue; the wings are pale, and the keel white. It flowers during a great part of the summer, and the seeds ripen in autumn. It grows naturally at the Cape.

The second species is a shrub with angular branches, and lateral solitary flowers without bractes. It is a native of the Cape, flowering in June and July.

The third has a shrubby stem, determinately branched, with round pubescent branches: the leaves sessile: leaflets even, dotted, pointed at the end with a patulous spine: stipules chaffy, lanceolate, acuminate, ciliate: the spikes terminating, solitary, sub-villose, peduncled: the flowers separated by ovate-acuminate ciliate bractes, almost the length of the flowers; the corolla violet-coloured, with a white keel having a violet spot in front. It is a native of the Cape, flowering in June and July.

The fourth species is a shrub, with rough-haired rigid branches: the leaves petioled: leaflets sub-petioled, sub-pubescent: the flowers at the ends of the branches: calyces pubescent: corollas violet-coloured. It is a native of the Cape, continuing in flower most part of the summer.

The fifth has a perennial root, but the stalk not of long duration, seldom lasting more than two years: it rises about two feet high, sending out two or three slender branches: the leaflets about two inches long, and one inch and a quarter broad, on long foot-stalks: the leaves, if headed, emit a strong scent of bitumen: the heads of flowers are on axillary peduncles seven or eight inches long, and blueish, smelling like black currants. It is a native of Italy, Sicily &c., flowering most part of the summer.

The sixth species has diffused, herbaceous stems, with glandular dots scattered over them: the leaflets roundish, very blunt, obsoletely toothed or angular, sprinkled with glandular dots; the middle one larger and petioled: the spikes axillary, oblong, on peduncles the length of the leaves. It is a native of Madeira, flowering late.

The seventh is an annual plant: the stalks rise two feet high, and have at each joint one leaf about two inches long, and an inch and a half broad, having one strong midrib, from which come out several veins, that run towards the top of the leaf: the flowers are produced on long slender axillary peduncles, collected into

small round heads, and are of a pale flesh-colour. It grows naturally in India, and flowers in July in this climate.

The eighth species is also an annual plant, with a very branching herbaceous stalk, rising a foot and half high, spreading wide on every side: the leaves are composed of five or six pairs of narrow wedge-shaped leaflets, terminated by an odd one: the flowers are collected in close oblong spikes at the ends of the branches, are small, and of a light blue colour. It is a native of Vera Cruz.

Culture.—These plants are increased by sowing the seeds in the early spring months, on a moderate hot-bed, or in pots, plunging them in it. When the plants have attained three or four inches in growth, they should be planted out into small pots separately, gradually hardening them to the open air, so as to be placed out in it in the beginning of the summer. They are likewise capable of being increased by planting cuttings of the young shoots in the summer months, in pots filled with light earth, plunging them in a moderate hot-bed and covering them close with glasses, watering and shading them well till they have stricken root.

They afford variety among other potted greenhouse plants.

PSEUDO ACACIA. See ROBINIA.

PSEUDO ACORUS. See IRIS.

PSEUDO ASPHODELUS. See ANTHERICUM.

PSEUDO CAPSICUM. See SOLANUM.

PSEUDO DIGITALIS. See DRACOCEPHALUM.

PTELEA, a genus containing a plant of the shrubby kind.

It belongs to the class and order *Tetrandria Monogynia*, or *Dioecia Tetrandria*, and ranks in the natural order of *Terebinthaceæ*.

The characters are: that in the male, the calyx is a four-parted perianthium, acute, small, deciduous: the corolla has four petals, oblong, concave, spreading, larger than the calyx, coriaceous: the stamina have four awl-shaped filaments, erect, curved in at the top, flattish and villose at the base, almost the length of the corolla: anthers roundish: the pistillum is an ovate germ, small, abortive: style very short, bifid at the top: stigmas obsolete: female; the calyx and corolla as in the male: the stamina filaments, as in the male, much shorter than the corolla: anthers roundish, barren: the pistillum is an ovate germ, compressed, biggish: style short, compressed: stigmas two, bluntish, diverging: the pericarpium is a roundish drupe, large, juiceless, compressed, membranaceous-winged, two-celled; the seeds solitary, oblong, attenuated upwards.

The species is *P. trifoliata*, Three-leaved Ptelea, or Shrubby Trefoil.

It rises with an upright woody stem ten or twelve feet high, dividing upwards into many branches, covered with a smooth grayish bark, garnished with trifoliate leaves standing upon long foot-stalks: the leaflets are ovate or ovate-lanceolate, smooth, and of a bright green on their upper side, but pale on their under; these come out late in the spring, soon after which the bunches of flower-buds appear, which is generally in the beginning of June, the leaves being then but small, and afterwards increase in size, but are not fully grown till the flowers decay: the flowers are produced in large bunches at the end of the branches; are of an herbaceous white colour, composed of four or five short petals, ending in acute points; fastened at their base to a short calyx, cut into four segments almost to the bottom. It grows naturally in North America.

There is a variety with five leaves.

Culture.—This plant may be increased by seeds, cuttings and layers.

The seeds should be sown in the early spring months, as March, in pots filled with light rich mould, plunging them in a moderate hot-bed to bring up the plants, giving them occasional waterings during the summer season, and protecting them during the winter from severe frost, planting them out in the following spring in nursery-rows, to get strong for being finally planted out.

The cuttings should be made from the young shoots, and planted in pots filled with light earth in March, plunging them in a hot-bed to strike them, but they should not have much heat, due shade being given. They readily strike root, and may be planted out in the following autumn.

The layers may be laid down in the autumn, choosing the young shoots for the purpose, giving them a slit underneath, and then placing them in the soil. They are mostly rooted in the course of a twelvemonth.

These plants are proper for shrubberies and other places in pleasure-grounds, where they have a very ornamental effect.

PUDDING-GRASS. See *MENTHA PULEGIUM*.

PULMONARIA, a genus furnishing plants of the hardy perennial fibrous-rooted kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a one-leaved perianthium, five-toothed, prismatic-pentagonal, permanent: the corolla one-petaled, funnel-form: tube cylindrical, the length of

the calyx: border half-five-cleft, blunt, from upright-spreading: throat pervious: the stamina have five filaments, in the throat, very short: anthers erect, converging: the pistillum has four germs: style filiform, shorter than the calyx: stigma blunt, emarginate: there is no pericarpium: calyx unchanged, fostering the seeds at bottom: the seeds four, roundish, blunt.

The species cultivated are: 1. *P. officinalis*, Common Lungwort; 2. *P. angustifolia*, Narrow-leaved Lungwort; 3. *P. Virginica*, Virginian Lungwort.

The first has a perennial fibrous root: the lower leaves rough, about six inches long, and two inches and a half broad, of a dark green on their upper side, marked with many broad whitish spots, but pale and unspotted on their under side: the stalks almost a foot high, having several smaller leaves on them standing alternately: the flowers are produced in small bunches at the top of the stalks, of different colours. It is a native of Europe, flowering from March to May.

The second species has leaves much narrower than those of the first sort, and covered with soft hairs, not spotted: the stalks rise a foot high, and have narrow leaves on them, of the same shape with those below, but smaller, and almost embracing: the flowers are produced in bunches on the top of the stalks, of a beautiful blue colour. It is a native of Sweden.

It varies with white flowers.

The third has a perennial, thick, fleshy root, sending out many small fibres: the stalks a foot and half high, dividing at the top into several short branches: the leaves near the root four or five inches long, two inches and a half broad, smooth, of a light green, on short footstalks; those upon the stem diminish in their size upwards, are of the same shape, and sessile. Every small branch at the top of the stalk is terminated by a cluster of flowers, each standing upon a separate short peduncle. The most common colour of these flowers is blue; but there are some purple, others red, and some white. They appear in April, and if they have a shady situation continue in beauty great part of May. It grows upon mountains in most parts of North America.

Culture.—These plants are increased by seeds, and parting the roots.

The seeds should be sown in the spring, in a bed or border of common earth, raking them in. They soon come up, and in the latter end of the summer they should be put out, either where they are to remain, or in nursery-beds, till October, when they should be planted out finally.

The roots should be parted in the autumn, as about August or September, but the sooner

P U N

after they have done flowering, the better. They should not be divided too small, and be planted directly; when they flower strong in the following spring. They afford ornament in shady situations.

PUMPKIN or **PUMPKIN**. See **CUCURBITA**.

PUNICA, a genus containing plants of the tree and shrub kinds.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved, bell-shaped, five-cleft perianthium, acute, coloured, permanent; the corolla has five roundish petals, from upright spreading, inserted into the calyx: the stamens have numerous capillary filaments, shorter than the calyx, and inserted into it: anthers somewhat oblong: the pistillum is an inferior germ: style simple, the length of the stamens: stigma headed: the pericarpium is a sub-globular pome, large, crowned with the calyx, divided into two chambers by a transverse partition, the upper having about nine, the lower about three cells: partitions membranaceous: the seeds very many, angular, succulent: receptacle fleshy, scrobicular, dividing each cell of the pericarp two ways.

The species are: 1. *P. granatum*, Common Pomegranate Tree; 2. *P. nana*, Dwarf Pomegranate Tree.

The first is a tree which rises with a woody stem eighteen or twenty feet high, sending out branches the whole length, which likewise put out many slender twigs, rendering it very thick and bushy, some of which are armed with sharp thorns: the leaves are narrow spear-shaped, about three inches long, and half an inch broad in the middle, drawing to a point at each end; are of a light lucid green, and stand opposite: the flowers come out at the ends of the branches, singly or three and four together; frequently one of the largest terminates the branch, and immediately under that are two or three smaller buds, which continue a succession of flowers for some months. The fruit is a pome berry, covered with a hard coriaceous rind including a pulp. It is a native of Spain, Portugal, &c. In the West Indies, where it is supposed to have been introduced from Europe, the fruit is larger and better flavoured.

There are several varieties: as the Large Double-flowered, and the Striped-flowered.

The second species seldom rises more than five or six feet high: the flowers are much smaller than those of the common sort; the leaves are shorter and narrower; the fruit is not larger than a nutmeg, and has little flavour: but it may be kept within compass; and in the West Indies, where it is a native, and is planted

Vol. II.

P Y R

for hedges, it continues flowering great part of the year.

Culture.—The first sort and varieties are readily increased by layers; which should be laid in autumn, choosing the young branches for the purpose, giving a little slit underneath at a bud, and laying them in the usual way, giving occasional waterings in summer; and by the following autumn they will be well rooted, and fit to be planted in nursery-rows for two or three years, to get strength, and then planted where they are to remain.

Those of the common sort and varieties may be trained as half or full standards, or as dwarfs; but those designed for walls should be managed as directed for peaches, &c.

This sort may be planted against warm walls, and be pruned and trained as other fruit-trees.

Of this sort, the double-flowering kind is much more esteemed than the other in this country for the sake of its large, fine, double flowers, which are of a most beautiful scarlet colour; and, if the trees are supplied with due nourishment, continue to produce flowers for two months successively; which renders it one of the most valuable flowering trees. This sort may be rendered more productive of flowers by grafting it upon stocks of the single kind, which check the luxuriance of the trees, and cause them to produce flowers upon almost every shoot.

The second sort may be raised also by layers, as the former, but must be planted in pots filled with rich earth, and preserved in a greenhouse. In the summer, when the flowers begin to appear, if the plants are exposed to the open air, the buds will fall off without opening; they should therefore be placed in an airy glass case, and a large share of air should be given them every day in warm weather. By this treatment the plants may be continued in flower upwards of three months, and make a fine appearance.

These are very ornamental trees for shrubberies and other places.

PURGING NUT. See **IATROPHA**.

PURPLE APPLE. See **ANNONA**.

PURSLANE. See **PORTULACA**.

PURSLANE TREE. See **PORTULACARIA**.

PYRUS, a genus containing plants of the fruit-tree kind.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved perianth, concave, five-cleft, permanent: segments spreading: the corolla has five petals, roundish, concave, large, inserted into the calyx: the stamens have twenty filaments, awl-shaped, shorter than the corolla, inserted into the calyx:

anthers simple: the pistillum is an inferior germ: styles five, filiform, the length of the stamens: stigmas simple: the pericarpium is a roundish pome, umbilicate, fleshy, with five membranaceous cells: the seeds some, oblong, blunt, acuminate at the base, convex on one side, flat on the other.

The species are: 1. *P. communis*, Common Pear-tree; 2. *P. Malus*, Common Apple-tree; 3. *P. spectabilis*, Chinese Apple-tree; 4. *P. prunifolia*, Siberian Crab-tree; 5. *P. coronaria*, Sweet-scented Crab-tree; 6. *P. Cydonia*, the Quince-tree.

The first grows to a lofty tree, with upright branches, the twigs or branchlets hanging down: the leaves are elliptical, obtuse, serrate; the younger ones clothed with a deciduous cotton underneath and along the edge: the stipules linear: the flowers in terminating villose corymbs of a snow white colour: the fruit is a pome. It is a native of Europe.

It is observed that "the Wild Pear, the mother of all the orchard and garden varieties, is thorny. The stipules are setaceous, white (or reddish), deciduous: the peduncles alternate; and the calyx clothed with a ferruginous wool."

There are numerous varieties; but those of most importance for cultivation are:

The Little Musk, which is often termed the Supreme. The fruit, when ripe, is of a yellow colour; the juice somewhat musky; and, when gathered before it be too ripe, is a good fruit. It becomes ripe about the latter end of July, but continues good only a very short time.

The Chio, or Little Bastard Musk, which is pretty much like the other, but smaller. The skin, when ripe, has a few streaks of red on the sun side.

The Green Chissel, or Hastings, which is a middle-sized fruit, that always remains green, and is full of juice when ripe. It becomes ripe in the beginning of August.

The Red Muscadelle, which is a large early pear, of great beauty; the skin is of a beautiful yellow striped with red, and the flesh has a rich flavour. It sometimes produces two crops in a year; the first about the end of July, and the second in September, or thereabouts.

The Little Muscat, which is a small pear, having the skin very thin, and of a yellowish colour when ripe. This fruit has a rich musky flavour, but does not keep long. It becomes ripe about the beginning of August.

The Lady's Thigh, which is here commonly called Jargonelle, is of a russet green colour from the sun, but towards it inclining to an iron colour; the flesh is breaking, and has a rich musky flavour. It becomes ripe about the middle of August.

The Windsor, which has a smooth skin, and when ripe is of a yellowish-green colour; the flesh is very soft, and, if permitted to hang but two or three days after it is ripe, grows mealy and is good for nothing. It becomes ripe about the latter end of August.

The Jargonelle, which is commonly called Cuisse Madame. According to Mr. Forsyth it is certainly the true French Jargonelle; and the pear which commonly goes by that name here is the real Cuisse Madame, or Lady's Thigh; it being very probable that the names have been changed in coming to this country. This pear is somewhat like the Windsor; the skin is smooth, and of a pale green colour. It is a plentiful bearer; but the flesh is apt to be mealy if it stands to be ripe, which is about the middle of August. It bears best on standards.

The Orange Musk, which is of a yellow colour spotted with black; the flesh is musky, but very apt to be dry. It ripens about the latter end of August.

The Great Blanquet, or Bagpipe of Anjou, which has a smooth skin of a pale-green colour; the flesh is soft, and full of juice of a rich flavour. It ripens about the middle of August.

The Little Blanquet, which is much less than the former; of a pale colour, and the flesh tender and full of a rich musky juice. It ripens about the latter end of August.

The Long-stalked Blanquet has a very smooth skin, white, and a little coloured towards the sun, and is full of a rich sugary juice. It becomes ripe at the latter end of August.

The Skinless or Early Russelet, which is of a reddish colour, the skin extremely thin, and the flesh melting and full of a rich sugary juice. It ripens in the latter end of August.

The Musk Robine, or Queen's Pear (also called the Amber Pear), which is small, and of a yellow colour when ripe; it has a rich musky flavour, and is a great bearer. It ripens about the latter end of August.

The Musk Drone, which has a skin of a yellow colour when ripe, and a rich musky taste; but is apt to grow mealy if left too long on the tree. It ripens about the beginning of September.

The Red Orange, which is of a greenish colour; but the side next the sun changes to a purple colour when ripe; the flesh is melting, and the juice sugary, with a little perfume. It ripens in the beginning of August.

The Cassolette, or Green Muscat, is a small greenish pear with some specks in the skin. It is full of a rich perfumed juice, and ripens in the latter end of September.

The Great Onion, Brown Admired, or King of Summer, which is of a brownish colour next

the sun, and becomes ripe in the beginning of September.

The Musk Orange, in which the skin is green, and the flesh melting. It ripens in the beginning of September.

The Avocat, or August Muscat, which has a smooth skin of a whitish yellow colour; the juice is richly sugared and perfumed, and it is esteemed one of the best Summer Pears yet known. It is a great bearer, and becomes ripe in the beginning of September.

The Rose, or Thorny Rose, which is shaped like the Great Onion Pear, but much larger, of a yellowish-green colour, but a little inclining to red next the sun. The flesh is breaking, and the juice musky. It becomes ripe in the beginning of September.

The Poire du Puchet, which has the flesh soft and tender, and the juice sugary. It ripens in the beginning of September.

The Perfumed Pear, which is of a deep red colour spotted with brown; the flesh melting, but dry, and has a perfumed flavour. It ripens in the beginning of September.

The Salviati, which is red and yellow next the sun, but whitish on the other side; the flesh is tender, and the juice sugary and perfumed. It ripens about the middle of September.

The Rose Water, which has the skin rough, and of a brown colour, the juice very sweet, tasting like rose-water. It ripens in the latter end of September.

The Russet, in which the flesh is soft and tender, and the juice agreeably perfumed. It ripens in the latter end of September.

The Great Mouthwater, which has the flesh melting and full of juice. It ripens about the latter end of September.

The Prince's Pear, which has a highly-flavoured juice, and is a great bearer, ripening about the latter end of September.

The Summer Bergamot, which is sometimes called Hamden's Bergamot. The flesh is melting, and the juice highly perfumed. It ripens about the latter end of September.

The Autumn Bergamot, which is smaller than the former; the flesh is melting, and the juice highly perfumed. It is a great bearer, and ripens in the beginning of October.

The Summer Bonchrétien, which is very full of juice, and is of a rich perfumed flavour. It ripens about the middle of September.

The Beurré Rouge, (the Red Butter Pear,) which has the flesh very melting and full of a rich sugary juice. It ripens in the beginning of October, and, when first gathered from the tree, is one of the very best sort of pears.

The Dean's Pear, which has the flesh melting

and full of juice, which is very cold. It is a great bearer, and ripens in the beginning of October.

The Swiss Bergamot has a melting flesh, and is full of juice. It ripens in the beginning of October.

The Long Green, in which the flesh is melting and full of juice. It ripens in the latter end of October. It is, by some, reckoned the same with the Mouthwater.

The White and Gray Monsieur John, which are the same; the difference of their colour proceeding from the different soils and situations wherein they grow, or the stocks on which they are grafted. If this pear be rightly managed, there are not many sorts in the same season to be compared with it. The flesh is breaking, and full of a rich sugared juice. It ripens in the latter end of October, or beginning of November.

The Flowered Muscat, which is an excellent pear; the flesh is very tender, and of a delicate flavour. It ripens in November.

The Vine Pear, which is of a dark red colour; the flesh very melting, and full of a clammy juice. It comes into eating in November.

The Rousseline Pear, which is of a deep red colour, with spots of gray; the flesh is very tender and delicate, and the juice very sweet, with an agreeable perfume. It ripens about the latter end of October, but does not keep.

The Knave's Pear, which has the flesh fine and tender, and the juice very much sugared. It ripens in the latter end of October.

The Marquis Pear is a pear which, when it does not change yellow in ripening, is seldom good; but if it does, the flesh will be tender, delicate, and very full of juice, which is sugared. It comes into eating in November.

The Crasane Pear, which has the flesh extremely tender and buttery, and full of a rich sugared juice. It is the very best pear of the season, and comes into eating about the latter end of December.

The Lansac, or Dauphine Pear, which has the flesh yellow, tender, and melting; the juice is sugared, and a little perfumed. It is in eating the beginning of December.

The Martin Sec (the Dry Martin), which is almost like the Russet in shape and colour; the flesh is breaking and fine; and the juice sugared, with a little perfume. It is in eating about the beginning of December.

The Amadot, which is rather dry, but highly-flavoured: it is in eating about the middle of December.

The Little Lard Pear, which is extremely fine; the flesh melting; the juice much sugared, and has an agreeable musky flavour. It is in eating the latter end of December, and is esteemed one of the best fruits in that season.

The *Louishon* (the *Good Lewis*), which has the flesh extremely tender, and full of a very sweet juice. It is in eating about the middle of December.

The *Colmar Pear*, which is very tender, and the juice greatly sugared. It is in eating about the beginning of January, and is esteemed an excellent fruit.

The *L'Eschasserie*, which has the flesh melting and buttery; the juice is sugary, with a little perfume. It is in eating about the first of January. It bears best on standards.

The *Virgouleuse Pear*, which is esteemed by some as one of the best fruits of the season; the flesh is melting, and full of a rich juice. It is in eating about the first of January. In dry and cold seasons it is very apt to crack, which greatly diminishes its value.

The *Ambrette*, which is esteemed a very good pear; the flesh is quite melting, and full of sweet perfumed juice. It comes into eating about the beginning of January.

The *Epine d'Hyver* (the *Winter Thorn Pear*), which has a very tender buttery pulp, of an agreeable taste, with a sweet juice highly perfumed. It is in eating about the latter end of December.

The *St. Germain Pear*, which is a fine fruit and keeps long; the flesh is melting, and very full of juice, which in a dry season, or if planted on a warm dry soil, is very sweet. It is in eating from December till February. Mr. Forsyth remarks, that it is "an excellent bearer, when planted as a dwarf standard, and comes in succession after the same sort of pears on wall-trees are over."

The *St. Austin*, which is pretty full of juice, and which is often a little sharp; the flesh is tender, but not buttery. It is in eating the latter end of December, and continues good two months, or longer.

The *Spanish Bonchrétien*, which is a large fine pear; the flesh is breaking, and the juice sweet. It is in eating in January.

The *Wilding of Cassoy*, which is also called the *Small Winter Butter Pear*, is a small fruit; the flesh is melting, and the juice very rich: it is an excellent bearer on standards. It is in eating in January.

The *Martin Sire*, or the *Lord Martin*, which is a good fruit; the flesh is breaking and full of juice, which is very sweet and a little perfumed. It is in eating in January.

The *Winter Russelet*, which has the flesh buttery and melting, and generally full of a sweet juice. It is in eating in the latter end of January.

The *Franc Real*, or the *Golden End of Winter*, which is only esteemed for baking.

The *Brown Beurré*, which is of a reddish-

brown colour on the side next the sun, and yellowish on the other side. The flesh is melting, and full of a rich juice. It ripens in October, and is esteemed an excellent pear.

The *Holland Bergamot*, *Amoselle*, or *Lord Cheney's*, which is a very good pear; the flesh is half buttery and tender, and the juice is highly flavoured. It keeps from the end of January till April.

The *German Muscat*, which is an excellent pear; it is buttery and tender, and the juice is highly flavoured. It is in eating from February till April or May.

The *Pear of Naples*, or *Easter St. Germain*, which is half-breaking; the juice is sweet, and a little vinous. It is in eating in March.

The *Winter Bonchrétien*, which is very large; the flesh is tender and breaking, and is very full of a rich sugared juice. It is in eating from the end of March till June.

The *La Pastorelle*, which is tender and buttery, and the juice sweet. It is in eating in March.

The *St. Martial*, or the *Angelic Pear*, which has the flesh tender and buttery, and the juice very sweet. It is in eating in March.

The *Wilding of Chaumontelle*, which is melting, the juice very rich, and a little perfumed. It is in eating in January.

The *Brown St. Germain*, which is a very fine high-flavoured pear on dwarfs and standards, and comes in after the *Wall St. Germain*. It continues in eating from December to the end of March.

The *Pear d'Auch*, which was introduced by the late Duke of Northumberland. It much resembles the *Colmar*, but is fuller towards the stalk. It is in eating from Christmas to April, and is, without exception, the best of all the *Winter Pears*.

The *Swan's Egg*, which is a middle-sized pear, in shape like an egg; it is of a green colour, thinly covered with brown; the flesh is melting, and full of a pleasant musky juice. It comes in eating in November. It is healthy, and bears well either as a standard or in any other way.

The *Bergamot de Pasque*, which has also the following names:—the *Terling*, the *Amoselle*, the *Paddington*, and the *Tarquin*. It is a fine handsome fruit, green when gathered, and of a yellowish or straw colour when ripe. It comes into eating about the month of April, continues till June, and makes a very handsome appearance at table.

The *Golden Beurré*, which is a very fine pear; it is of a beautiful scarlet colour next the sun, and of a gold colour on the other side. The

flesh is melting, and the juice high-flavoured. It ripens in October. It succeeds best on an east aspect, and a loamy soil. It is a plentiful bearer. Mr. Forsyth observes, that it "was introduced from Burgundy by the late Marshal Conway, and was first raised, in this country, at his seat of Park Place, near Henley-upon-Thames, now the seat of Lord Malmesbury."

The Williams's Seedling Pear, which resembles a Summer Bonchrétien, but is more juicy, is a great bearer, and ripens in September. Mr. Forsyth says that it "will be a valuable acquisition to the market-gardeners, as it immediately succeeds the Windsor Pear."

The Citron de Carmes, which is a middle-sized pear, of a yellowish-green cast, full at the eye; of a round shape, but tapering a little toward the stalk, which is long. It becomes ripe in July.

And the True Golden Beurré, which in shape and size resembles the Brown Beurré; but is of a reddish-brown colour next the sun. It is a very fine pear, but does not keep long. It comes into eating in October.

Mr. Forsyth gives the following selection from Anderson's and Co.'s Catalogue, of Edinburgh:

Of the Summer Kinds—The Pear James, which is soon ripe, and soon rotten, has a little flavour, and is the earliest pear in Scotland.

The Early Carnock, which is indifferent, of a yellow colour, and bright red towards the sun; making a beautiful standard tree.

The Lemon, Lady's Lemon, or Lady Lamont, which is indifferently good, but principally valued for coming early, and being a good bearer in common.

The Green Pear of Pinkey, which is a small green pear, nearly round, of a sweetish taste or flavour.

The Forrow Cow, a Clydesdale pear, which is a large pear with a short stalk; flat towards the eye; the colour red and yellow; the flesh tender, and musked in its flavour.

The Pear Sauch, a Clydesdale pear, which is a big-bellied beautiful pear; the tree large, a great bearer, and fit for an orchard; but the fruit is not very good.

The Gray Honey, which is a pretty good pear.

The Green Orange Pear, or Orange Vert, which is a very good pear.

The Brute Bone, Chaw Good, or the Pope's Pear, which is only an indifferent sort.

The Golden Knap, supposed Scotch, which is a small Summer Pear, of tolerably good qualities.

The Early Achan, an indifferent fruit; greatly inferior to the Winter Pear of that name.

The Hanging Leaf, which is the name in Clydesdale, is good and beautiful; almost round; its colour red and yellow: a delicious sweetness is found in its taste.

The Scots Bergamot, which is a large good pear, of a yellow and red colour; the flesh tender and juicy.

The Longueville, which is very good, but a precarious bearer; supposed French, though not in their catalogues under that name.

The Muskéd Bonchrétien, Gratioli, Cucumber, or Spinola's Pear, which is a very good pear when grafted on a free stock; its pulp being somewhat between short and tender, with a great deal of perfumed juice; its colour red on one side, and white on the other.

And the Saffron Pear, which is a pretty large well-shaped pear, fit for the orchard or the field.

Of the Autumnal Kinds—The Keather, which is a Clydesdale pear, of middling size, and oblong shape, its juice agreeable.

The French Carnock, which is tolerably good.

The Elshin Haft, or Good-Man Pear, which is a long pear, flat towards the eye; its colour green and yellow; its flesh hard, dry, and sweet in the taste.

The Drummond, or Late Scotch Carnock, which is very good, if eaten before it grows mealy; its colour a bright red and yellow.

The Vicar, an oblong pear, with the colour yellow, red and striped; tender, sweet, and musked, but dry in eating.

The Royal Orange Bergamot, which differs from the Orange Bergamot in being yellower, and sometimes having a faint red on one side.

The Green Pear of Yair, which is sweet, juicy, and melting; of a moderate size; taking its name from Yair, on Tweed-side, where it was first discovered.

The Rob Hind, which is very indifferent.

The Le Besideri, the Wilding of the forest of Ileri in Bretagne, which is a yellowish pear, of middle size, but which is indifferent.

The Unicorn Pear, which is of a beautiful red and yellow colour; but rather austere in the taste or flavour.

Of the Winter Kinds—The Winter Achan, which is a Scotch Pear; among the best early Winter Pears, and equal to most of those of the French kind.

The Brier Bush, which is Scotch; a good pear, and will ripen in most seasons; it is a small pear, of a firm substance, and sweet taste.

The Brompton Park, which is a seedling sent by Jefferys of that name.

The Round Winter, which is a Clydesdale pear; a very excellent Winter Pear.

The Poir Portrail, or Gate Pear, which is proper for baking.

The La Double Fleur, or the Double-flowering Pear, which is a large flat beautiful pear, with a smooth skin, and blush colour on one side, and yellow on the other: it is the best to preserve, taking a beautiful red colour from the fire.

And to these the following list is added:—The Ambrosia Pear, the Ashton Town, the Autumn Musk Bonchrétien, the Bishop's Thumb, the Bloody Pear proper for baking, the Brocas Bergamot, the Barland proper for perry, the Besideri fit for baking, the Beurré du Roi, the Black Pear of Worcester fit for baking, the Britannia, the Burdelieu, the Doyenne or St. Michael, the Catillac fit for baking, the Easter St. Germain, the Gansel's Bergamot, the Golden Beurré, the Gray Beurré, the Gray Goodwife, the Green Sugar, the Green Bergamot, the Huntingdon Pear, the Hufcap proper for perry, the King's Catharine, the Lammias, the London Sugar, the Muscat Almain, the Musk Blanquet, the Oldfield proper for perry, the Orange Bergamot, the Pear Piper, the Pyrus Pollveria, the Red Admirable, the Rough Cap proper for perry, the Scotch Bergamot, the Seven-angled, the Silver-striped, the Spanish Red Warden best for baking, the Squash proper for perry, the Striped Verte Longue, and the White Beurré.

And for small gardens, where there is room only for a few trees, the following are recommended as proper for furnishing a regular succession of fruit:

Summer Kinds—The Musk Pear, the Green Chissel, the Jargonelle, the Summer Bergamot, and the Summer Bonchrétien.

Of the Autumn Kinds—The Orange Bergamot, the Autumn Bergamot, the Gansel's Bergamot, the Brown Beurré, the Doyenne or St. Michael, and the Swan's Egg.

Of the Winter Kinds—The Crasane, the Chaumontelle, the St. Germain, the Colmar, the D'Auch, the L'Eschasserie, the Winter Bonchrétien, and the Bergamot de Pasque.

The second species is a spreading tree, with the branches and twigs irregular and twisting, more horizontal than in the first: the leaves ovate, serrate, the younger ones pubescent underneath: the stipules linear: the flowers in terminating, sessile, villose umbels, white, finely tinged with red on the outside: the fruit roundish, umbilicate at the base, and acid. It is a native of Europe.

In its wild state it is called the Crab or Wilding, and is armed with thorns, as well as the Wild Pear. Miller mentions two varieties in

the fruit of the Crab, one white, the other purple towards the sun; but it is commonly yellowish green with a tinge of red. And also a variety with variegated leaves.

There are a great many varieties of the Apple, but the following are given by Mr. Forsyth as the most deserving of attention:

The Acklam's Russet, which is a small Yorkshire apple, of a russet colour toward the sun, and yellow on the other side; it becomes ripe in January, and keeps till March.

The Aromatic Pippin, which is a very good apple, of a bright russet next the sun; and the flesh has a fine aromatic flavour. It ripens in October.

The Baxter's Pearmain, which is a real Norfolk apple, of a handsome size, and pale-green colour, full of small dark spots. It is a fine kitchen fruit, and will keep till April. It is also a good eating apple.

The Beauty of Kent, which is a fine large apple, resembling a Codlin. It is streaked with a fine red towards the sun, and of a beautiful yellow, with some streaks of red on the other side. It is a very good apple, coming into eating in September, and keeping till the latter end of April.

The Belle Grisdeline, which is a new seedling raised at Norwich, of much beauty, and never failing to afford crops. It was first propagated by Mr. Lindley, about seven years ago, who gave it this name. It is a handsome apple, resembling the Bursdoff, of a yellow colour, with red toward the sun, and an excellent table apple, keeping till March.

The Bell's Pearmain, which is a real Norfolk apple, large and handsome; red toward the sun, and yellow on the other side. It is a fine kitchen fruit, and pretty good to eat raw, keeping till June.

The Best Pool, which is a middle-sized apple, of a pale-green colour, streaked with red towards the sun. It is a good apple, in eating from January to April.

The Black Apple, which is a middle-sized fruit, of a dark mahogany colour next the sun, but fainter on the other side. It is of a pleasant sweet taste, keeping till the middle of April.

The Bland's Summer Pippin, which is a handsome apple, of a gold colour, and an agreeable flavour. It is a great bearer, ripe in September, and keeps till Christmas.

The Blatche's fine small Table-Apple, which is about the size of a small Golden Pippin; red toward the sun, and green on the other side. It has a sugary taste, and comes into eating in January.

The Boomrey, which is a pretty large handsome

apple, of a flat shape, and deep-red colour; and the flesh is streaked with red. It is not fit to eat raw, but will do well for cider, or for the kitchen. It keeps till April.

The Bovey Redstreak, which is a handsome apple, of a flattish shape, beautifully streaked with a bright red next the eye, which is small, and of a yellow colour about the footstalk. It keeps till the latter end of October.

The Broad-eyed Pippin, which is a fine large flat apple, with a very large eye; the colour is a greenish-yellow, with a little red toward the sun. It is a good apple, and keeps till May.

The Brandy Apple, which is about the size of a Golden Pippin, flat-shaped, and of a yellowish russet colour. It is of a pleasant flavour; comes into eating in January, and keeps till March.

The Bursdoff, or Queen's Apple, which is a beautiful fruit, red next the sun, and of a fine yellow on the other side. It is a very fine apple; in Mr. Forsyth's opinion, next in perfection to the Golden Pippin, and about the same size. It is in eating from November to the end of March.

The Cadbury Pound, which is a middle-sized apple, of a light-green colour. It is of a good flavour; ripening in January, and keeping till March.

The Carnation Apple, which is a beautiful middle-sized fruit, finely striped with red. It is ripe in January, and keeps till May.

The Carbury Pippin, which in size and shape resembles the French Crab, and is of a deep green colour. It is a good baking apple, keeping till March.

The Caraway Russet, which is a handsome russet-coloured apple, about the size of a Nonpareil.

The Calville, Red and White, which are good apples, and of a vinous taste. Some have a red and some a white pulp, the white being reckoned of a most delicious taste. They are in eating in September and the following month.

The Cat's Head, which is a large oblong apple, of a greenish-yellow colour, with a little brownish red next the sun; sometimes the colour inclines to a russet. It is a good baking apple, and is in eating from October to December.

The Cockagee, which is a conical-shaped middle-sized apple, red on that side next the sun, and of a fine yellow colour on the other. If properly managed, the fruit keeps till February. It is a famous cider apple, and also bakes well.

The Codlin, which is generally the first apple that is brought to market. Its fruit is so well known that it needs no description. It is

in eating from July to December; and is good either for baking or boiling.

The Cornish Nonpareil, which is rather under the middle size, is a little flattened, and of a russet colour. It is a very good apple, and keeps till the middle of March.

The Cornish Pearmain, which is of a middling size, and long shape; of a dull green colour on one side, and russet on the other. It is a very good apple, and keeps till the latter end of April.

The Court-of-Wick Pippin, which is described by Mr. Billingsly, in his "Survey of Somersetshire," as "the favourite apple, both as a table- and cider-fruit, taking its name from the spot where it was first produced. It originated from the pip or seed of the Golden Pippin, and may be considered as a beautiful variety of that fruit. In shape, colour, and flavour, it has not its superior: the tree is large, handsome, and spreading, and a very luxuriant bearer. On the whole, it cannot be too strongly recommended." It is larger than the Golden Pippin, of a yellowish-green colour, and a little tinged with red next the sun. It comes into eating in January.

The Cockles Pippin, which is a handsome oval-shaped apple, below the middle size, of a russet colour, mixed with yellow and red. It keeps till April.

The Corpendu, or Hanging Body, which is a very large apple, and has a red cast on the side towards the sun; but is pale on the other side. It takes its name from always hanging downwards; and comes into eating in September.

The Dalmahoy Pippin, which is about the size of a Golden Pippin, of a green colour, and a little streaked with red towards the sun. It has a tolerably good flavour, rather sharp; and is in eating from September to February.

The Dimock's Red, which is under the middle size, of a fine red colour, intermixed with a little yellow on the side from the sun. It is ripe in January, and keeps till March.

The Dredge's Seedling, which is a fine large apple, striped with red next the sun, and of a yellowish-green on the other side. This is an excellent kitchen apple, of a pleasant taste, and keeps till the latter end of January.

The Dredge's Beauty of Wilts, which is a beautiful apple, of a good size, and one of the finest yet known in point of general utility. It is of a fine bright yellow colour, spotted with red towards the sun; and has an excellent vinous flavour. It is good either for the table or baking, and keeps till March.

The Dredge's Russet, which is a small apple,

of a greenish-russet colour, and of a pleasant flavour. It is ripe in November, and keeps till Midsummer.

The Dredge's White Lily, which is a fine apple, of an exceeding high flavour, and keeps till March.

The Dredge's Fair Maid of Wishford, which is a fine middle-sized apple, of a yellowish-green colour, with some russet next the sun, and of an excellent flavour. It is a great bearer, and is in eating from Christmas to Easter, being an excellent dessert apple.

The Dredge's Queen Charlotte, which is a beautiful middle-sized apple, of a gold colour, with red towards the sun. It is of an exquisite flavour, comes into eating about Christmas, and keeps till February.

The Dredge's Fame, which is a good-sized apple, red towards the sun, and streaked like the Ribston Pippin on the other side. It is a most excellent apple, being in eating from Easter to Midsummer.

The Dumpling Apple, which is a handsome apple, and rather above the middle size, flat-shaped, and of a greenish-yellow colour, with some faint streaks of red. It keeps till March.

The Dutch Queening, which is a large apple, somewhat resembling the Cat's Head in shape. The colour is red next the sun, and green on the other side, with sometimes a little red. The fruit is fit only for the kitchen, and for making cider. It is ripe in January, keeping till the end of March.

The Elton's Yellow Kernel, which is a handsome middle-sized apple, of a yellow colour. It is a good table apple, being in eating from January to March.

The English Rennet, which is a handsome apple, beautifully streaked with red, but darkest towards the sun; of a tolerable flavour, but apt to grow mealy when kept too long. It keeps till the middle of May.

The Embroidered Apple, which is pretty large, and the stripes of red very broad, from which circumstance it takes its name. It is commonly used as a kitchen apple, becoming ripe in October.

The Everlasting Striped Apple, which is below the middle size, of a conical shape. The colour is a striped green towards the footstalk, and red towards the eye.

The Fameuse, which is a pretty large apple, of a beautiful dark red, with a little yellow on the side from the sun. Its flesh is very white, and full of a rich sugary juice; coming into eating about the latter end of October. It was introduced from Canada by Mr. Barclay of Brompton.

The Fenouillet, ou Pomme d'Anis, the Fennel or Anise Apple, which is a middlesized fruit, of a gray colour; the pulp is tender, and has a spicy taste, like aniseed. It becomes ripe in September and October.

The Flower of Kent, which is a large handsome apple, of a yellow colour, and pretty good flavour. It keeps till the middle of April.

The Fox-whelp, which is a small apple, streaked with red. It is ripe in January. It is a cider apple.

The Franklin's Golden Pippin, which is a handsome middle-sized apple, of a conical shape and gold colour, beautifully marked with dark spots. The fruit has a fine aromatic flavour, and deserves the first place at the table; but it is a shy bearer. It comes into eating about the middle of November.

The French Crab, which is a large handsome apple, of a deep green colour, with a little red next the sun. It will keep all the year; is a good baking apple, and, if the summer be warm, pretty good for eating, and is a great bearer.

The French Codlin, which is a pretty large apple, of a conical shape, and green colour, with red towards the sun, coming into eating in January.

The Fearn's Pippin, which is of the shape and size of a Nonpareil. It is of a beautiful scarlet next the sun, and of a golden yellow on the other side. It makes a fine show at table, and keeps till the latter end of February.

The French Spaniard, which is a large apple, in form of a hexagonal prism with the angles a little rounded, and of a yellowish-green colour: is pretty good, and keeps till the latter end of April.

The French or White Rennet, which is a large fruit, of a yellowish-green colour, with some gray spots. It has a sugary juice, and is good either for eating or baking.

The Gargey Pippin, which is a handsome conical-shaped apple, under the middle size, of a greenish yellow colour, with a little red towards the sun. This is a pretty good apple, and keeps till May.

The Gilliflower, which is a fine handsome apple, red towards the sun, and of a yellowish-green on the other side, having a fine flavour, and keeping till the latter end of March.

The Golden Rennet, which is a beautiful apple, a little flattened; of a fine red colour towards the sun, and yellow on the other side. It is a good eating apple, and keeps till February.

The Golden Russet, which is a fine middle-sized apple, of a golden-russet colour, from which it takes its name. It is a good apple, and keeps long.

The Golden Pearmain, which is a fine apple, above the middle size, of a fine deep red towards the sun, with a little yellow on the other side: when much exposed to the sun it is sometimes red all over.

The Golden Mundi, which is a fine handsome apple, beautifully streaked with red; of a good flavour, excellent for baking, and will keep till January. It is a good sauce apple.

The Golden Gloucester, which is a handsome middle-sized apple, of a flat shape, and gold colour, with red toward the sun. It is a good apple, and keeps till March.

The Golden Knob is a handsome though rather small apple, of a fine gold colour, sometimes inclining to a russet. It has a pleasant flavour.

The Golden Pippin is well known; and the French own it to be of English origin. It is almost peculiar to this country; for there are few countries abroad where it succeeds well. It is yellow as gold; the juice is very sweet; the skin (especially where exposed to the sun) is often freckled with dark yellow spots. It is certainly the most antient as well as the most excellent apple that we have. It ripens in October, and keeps through the winter. It has several sub-varieties.

The Godolphin Apple, which is a very handsome large fine fruit, streaked with red on the side next the sun, and of a yellowish colour on the other side. It is in eating from the latter end of September to December.

The Green Dragon, which is a fine large apple, of an excellent flavour, and pale-green colour. It is rather too large for the table, and is therefore mostly used as a kitchen apple. It keeps till March.

The Great or Large Russet, which is a middle-sized fruit, of a russet-colour, with a little dark-red toward the sun. A pretty good apple, and keeps till April.

The Griddleton Pippin, which is a large angular-shaped apple, of a green colour, with a little blush toward the sun. It is a baking apple, and keeps till March.

The Grumas's Pippin, which is about the size and shape of a Golden Pippin; of a dingy-green colour next the sun, and of a dull yellow on the other side. It is ripe in January, and keeps till April.

The Hagloe Crab, which is a yellow-coloured conical-shaped apple, below the middle size. It is ripe in January; but is only fit for making cider, or for baking.

The Hall Door, which is a fine large apple, of a flat shape, beautifully streaked with red toward the sun, and of a greenish-yellow on the

VOL. II.

other side. It is of a fine flavour, and is in eating from January till March.

The Hallingbury, which is a large flat-shaped apple, with large ridges from the base to the crown. It is of a beautiful red toward the sun, and of a yellowish colour on the other side and towards the eye.

The Hampshire Nonsuch, which is a pretty large well-shaped apple, of a greenish-yellow colour, streaked with red. It keeps till the latter end of November.

The Harvey's Russet, which is so called in Cornwall, is a large russet-coloured apple, with a little red toward the sun. It is a famous kitchen fruit, and tolerably good raw, with a musky flavour.

The Holland Pippin, which is a middle-sized apple of a flattish shape. Its colour is yellow, in some places inclining to green, with, sometimes, a little red toward the sun. It is a pretty good apple, keeping till the middle of April.

The Hollow-eyed Pippin, which is a middle-sized apple, of a yellow colour, beautifully spotted with red toward the sun; and the eye is pretty deep. It is a good sharp-flavoured apple, keeping till the middle of May.

The Hollow-eyed Rennet of Cornwall, which is a handsome flat-shaped apple, under the middle size, of a greenish-yellow colour, sometimes intermixed with russet. It is of an excellent flavour, and keeps till April.

The Hedge Apple, which is a new fruit, of middle size and handsome conical shape, red toward the sun, and of a straw-colour on the other side. It is of a tolerably good flavour, and keeps till the latter end of April.

The Hogshead Apple, which is a small red fruit; the flesh is red, and the taste austere. It is a cider apple, becomes ripe in January, and keeps till March.

The Hubbard's, or the Russet Pearmain, which is a real Norfolk apple; and, though not handsome, is one of the best table apples. It is of a dark russet colour, becomes ripe in January, and keeps till April.

The John Apple, which is a middle-sized handsome fruit, of a green colour, with a little red toward the sun; the foot-stalk being very small. It is an excellent cider and baking apple, from Devonshire; is of an excellent flavour, and keeps till March.

The Isle-of-Wight Pippin, which is a handsome middle-sized apple, of a greenish-yellow colour.

The Juneting, or Jenning, which is a small yellowish apple, red on the side next the sun. It is a pretty fruit for early variety, and ripens

2 R

about the latter end of June or beginning of the following month.

The Kernel Redstreak, which is of a greenish-yellow, with broad streaks of a dark-red all over it, and a yellow ground finely speckled with red next the sun.

The Kernel Pearmain, which is a small handsome apple, red toward the sun, and of a yellowish-green mixed with red on the other side. It is of a good flavour, keeping till the middle of May.

The Kentish Pippin, which is a good-sized apple, finely streaked with red. It is of a fine flavour, comes into eating about Christmas, and keeps till February.

The Kentish Nonpareil, which is a handsome flat-shaped apple, of a light-russet colour, inclining to red toward the sun. It is of a good flavour; and keeps till May.

The King of the Pippins, which is a middle-sized apple, of a fine gold colour, a little streaked with red towards the sun. It is ripe in January, and keeps till the latter end of March, when it becomes mealy.

The King Apple, which is a middle-sized apple, of a conical shape; and its colour is that of a beautiful red intermixed with a little yellow on one side. This apple is of a pleasant sugary taste, and keeps till the latter end of April.

The Kirke's Seedling, which is a large beautiful apple of a fine red colour towards the base, and yellow toward the eye. The footstalk is slender, and the eye large.

The Kirke's Scarlet Pearmain, which is a handsome middle-sized apple, of a beautiful red toward the sun, and a little yellow on the other side; becoming ripe in January.

The Kirke's Scarlet Admirable, which is a good apple for baking, and of a beautiful scarlet colour, is in eating about the month of January.

The Kentish Fill-Basket, which is a species of Codlin, of a large size, and generally used for baking. It is in eating from August to October.

The Kirton or Crack'd Pippin, which is a middle-sized apple, of a greenish-yellow colour, with little dark spots. The coat is generally rough toward the footstalk. It is a good apple for the table, coming into eating in September.

The Lady's Finger, which is an excellent table apple, of a conical shape; red next the sun, and of a yellowish cast on the other side, having a sweet pleasant flavour, and keeping till May.

The Large Styre, which is a handsome cider

apple, of a yellow colour, with a little red next the sun. It becomes ripe in November.

The Lisbon Pippin, which is a handsome middle-sized apple, of a flat shape, a fine red toward the sun, and of a reddish-yellow on the other side. The flesh is firm, and has a sharp pleasant taste. It comes into eating in November.

The Loan's Pearmain, which is a large oval-shaped apple, of a dull green colour intermixed with a brownish red, deepest next the sun. It is a pretty good table apple, of a sharp taste, ripening in September and keeping till May, but is apt to grow mealy.

The London Pippin, or Five-crowned Pippin, which is a fine large apple, of a green colour, streaked with red toward the sun. It resembles the Ribston Pippin, but is larger. It has a pretty agreeable taste; and will come into eating about the latter end of November. It is good for the kitchen and table; and a most abundant bearer. It keeps till the middle of April.

The Le Calville d' Automne, the Autumn Calville, which is a large fruit, of an oblong figure, and of a fine red colour toward the sun, having a vinous juice, and is much esteemed by the French.

The Long Laster, which is a middle-sized apple, of an angular shape, and fine yellow colour, with a beautiful red next the sun. It is of a tolerable flavour, and keeps till the middle of May, but is apt to become mealy.

The Lemon Pippin, which is a handsome oval-shaped apple, of a gold colour. It is of a fine flavour, and will keep till the beginning of March.

The Long Seam, which is a large angular-shaped baking apple, of a pretty good flavour, with light green colour. It keeps till the latter end of January.

The Lord Cheney's Green, which is a middle-sized Yorkshire apple, resembling the Yorkshire Greening. It is of a dark green colour, with a little of a chocolate colour next the sun. It is a baking apple, and keeps till the middle of May.

The Lord Arundel's Apple, which is large, of an angular shape; the colour is green, with a little dingey red toward the sun. It is from France, and good for sauce, keeping well.

The Lord Camden's Rennet, which is a good-sized seedling, of a yellow colour, with a little brownish red next the sun. It is a good-flavoured apple, and keeps till March.

The Lucas's Pippin, which is a handsome middle-sized, cylindrical-shaped apple, of a beautiful orange colour. It is a pretty good fruit, and keeps till the latter end of April.

The Maiden's Blush, which is a small apple, of a dark mahogany colour next the sun, but paler on the other side, and sometimes of a greenish cast. The taste is austere, and of course this fruit is not fit for the table; but does very well for baking, or for cider. It keeps till the beginning of March.

The Mansfield Tart, which is a large Nottingham apple, but most known in Yorkshire. It is handsome, of a green colour, having a little cast of a brownish red, with dark spots next the sun, being a baking apple, and keeping till February.

The May Gemmet, which is rather under the middle size, of a greenish-yellow colour, slightly streaked with red next the sun. It keeps till April.

The Major Hemmings's Apple, which is a handsome middle-sized fruit, of a light-green colour, with a little brownish-red towards the sun. It is an excellent apple.

The Margil, which is an excellent apple, about the size of a Nonpareil. It is of a red colour with some yellow on one side; continues in use from November to the latter end of March; and is often sold in the London markets for a Nonpareil.

The Margaret Apple, which is a fine and beautiful fruit, yellow striped with red, of a delicate taste, sweet scent, and generally eaten off the tree. It is ripe in August.

The Minchall Crab, which is a handsome middle-sized Lancashire apple, of a yellow colour, with some brown spots. It is common in the Manchester market, and keeps till April.

The Monstrous Rennet, which is a very large apple, turning red towards the sun, and of a dark-green on the other side. It is generally preserved on account of its magnitude, as the flesh is apt to be mealy. It becomes ripe in October.

The Mother Rennet, which is rather under the middle size, of a greenish colour, with a little blush towards the sun. The eye is large and deep, and the footstalk small.

The New-England Pippin, which is a large angular-shaped apple, of a green colour, with a little brownish-red towards the sun. It has a pretty good flavour, and keeps till March.

The Newtown Pippin, which according to Mr. Forsyth is an American Apple, but said to be originally from Devonshire. It is a fine large apple, of a greenish-yellow colour, and red, with dark spots next the sun. When much exposed, it is of a beautiful red towards the sun, and of a gold colour on the other side. It has a fine flavour when not kept till it is too ripe, as then it becomes mealy. It is in eating from November to January.

The New Red Must, which is a fine large apple, of a pale red towards the footstalk, and of a greenish colour towards the eye. It is a cider apple, and for baking.

The New Red Pippin, which is a beautiful middle-sized apple of a dark-red colour, with a mixture of yellow on the side from the sun. It keeps till March.

The Nonsuch, which is a good bearer, and very fit either for the table or kitchen; the cooks, however, complain that it makes but a very small proportion of sauce. It is ripe in September and October.

The Nine Square, which, according to Forsyth, is a Gloucestershire apple. It is a large angular-shaped fruit, of a fine red towards the sun, and yellow on the other side, with a small mixture of red, keeping till April.

The Norfolk Colman, which is a middle-sized apple, of a mahogany colour towards the sun, and a dark green on the other side. It keeps till August.

The Norfolk Beefin, which is a good-sized apple, rather flatted, of a deep red colour towards the eye, but paler towards the footstalk.

The Norfolk Paradise, which is a large apple, of a dark red colour towards the sun, and green on the other side. It is a nice baking apple, and of a tolerable flavour for eating. It keeps till the middle of May.

The Norfolk Storing, which is a pretty large apple, of a dark red colour towards the footstalk, and green towards the eye. It is of a pleasant sharp flavour, being in eating from the latter end of January to the latter end of April.

The Northern Greening, which is a fine oblong apple, full at the footstalk, of a pale-green colour, with a little red towards the sun. It is nearly of an equal size from the base to the crown, and has a fine flavour, being ripe in January.

The Nonpareil, which is a fruit deservedly valued for the briskness of its taste. It is seldom ripe before Christmas, and, if well preserved, will keep till May. It is justly esteemed one of the best apples that have been yet known.

The Oak Peg, or Oaken Pin, which is an oval-shaped middle-sized fruit, of a green colour striped with white. It is very full towards the footstalk, which is small, keeping till June.

The Old English Pearmain, which is an oval-shaped apple, of a middle size, and fine red colour, with a little yellow towards the eye. It is of a pleasant sweet flavour; and is in eating from January to March.

The Old Red Must, which is a fine large apple, somewhat resembling the New Red Must

both in shape and colour, with the addition of dark red spots toward the footstalk.

The Old Red Pippin, which is a middle-sized apple, red towards the sun, and of a greenish colour on the other side. It is a good apple, and keeps till March.

The Orange Pippin, which is about the size of a large Golden Pippin; of a beautiful gold colour, with a little pale-red towards the sun. It is a handsome apple, of a good flavour, and makes a fine appearance at table, being in eating in October, and keeps till March, but gets flat in the taste when too long kept.

The Orleans Pippin, which is a small flat-shaped apple, of a dark red colour; resembling the Orleans Plum.

The Paradise Pippin, which is a handsome middle-sized apple, of a reddish cast. It comes into eating in October, but will not keep. It grows mealy when too ripe.

The Pauson, which is below the middle size, of a conical shape, and of a greenish yellow or light green colour. It is ripe in January.

The Pile's Russet, which is a middle-sized longish-shaped apple, russet about the footstalk, yellow towards the middle, and of a brownish red about the eye. It is a very firm fruit, of a sharp acid flavour, being much esteemed for baking. It ripens in October, and will keep till April.

The Pigeonette, which is rather below the middle size, of a conical shape. It is of a pink colour, pretty dark towards the sun.

The Pearson's Pippin, which is a nice apple, about the size of a large Golden Pippin, of a yellowish colour, and the form a little flat. In Devonshire, according to Mr. Forsyth, they put these Pippins into the oven just after the bread is drawn, laying a weight over them to flatten them, in the same manner as they do the Beef in Norfolk, and bring them to table as a sweetmeat. It is a very good dessert apple, and keeps till March.

The Pomme Grise, which is a fine apple, from Canada, of a flattish form, and russet colour, streaked beautifully with red. It ripens late, and keeps till March. It is an excellent eating apple.

The Pomme d'Api, which is much valued for its colour, being of a bright red. The tree is a good bearer, and the fruit is not subject to be shaken with high winds. The fruit should be suffered to hang on the tree till October or November, if the frost do not set in. It comes into eating in February and March, and keeps long; but is more admired for its beauty than its flavour or fineness of taste.

The Pomme Violette, the Violet Apple, which

is a pretty large fruit, of a pale-green, striped with red towards the sun. It has a sugary juice, and a flavour of violets, from which it takes its name. It ripens in October, and continues in eating till February or later.

The Pomroy, or King's Apple, which ripens nearly as soon as the Juneting; and, though not so beautifully covered, is larger and much better tasted. It has a sub-variety, which is a winter apple.

The Pound Pippin, which is a large handsome apple of a greenish colour; and is good for baking. It becomes ripe in January.

The Poor Man's Profit, which is a dingey-coloured oval-shaped apple, below the middle size. It is raised freely from cuttings; and keeps till January.

The Queening, which is from Gloucestershire, is a large apple of an irregular shape, having large ridges from the base to the crown. It is of a dark red, but deepest towards the sun. It is a good cider apple, and bakes well, keeping till the latter end of November.

The Queening Kernel, which is a fine apple, above the middle size, of a deep red colour, covered very thick with small whitish specks. It is a tolerably good apple, and keeps till the latter end of April.

The Queen's Pippin, which is a small handsome apple, of a yellowish-green colour, sometimes inclining to red on the side next the sun. It is a fine flavoured apple, very fit for the table, coming into eating in January, and keeping till May; but is apt to grow mealy when kept too long. Mr. Forsyth says, "the tree never grows to the height of other apple-trees."

The Quince Apple, which is a middle-sized fruit, of a yellow colour, with a little red towards the eye. It is of a pleasant sharp flavour; ripe in January, and keeps till April.

The Ramborn, which is a large fruit, of a fine red next the sun, and striped with a yellowish green. It ripens about the middle of September.

The Red Pearmain, which is smaller than the Pearmain in general. It is of a deep red, with a little yellow on one side. A pleasant sweet apple; and keeps till the middle of April.

The Red Streak, which is a handsome middle-sized apple, beautifully streaked with red. It is a good cider apple, becoming ripe in January.

The Red Streak Seedling, from Longleat, which is from the Dorsetshire Red Streak, is a beautiful apple, of a yellow colour streaked with red, particularly next the sun. Forsyth says, it is sold in the Bath and Bristol markets in the latter end of September and begin-

ning of October. It is a pretty good apple, but does not keep long.

The Red Bag, which is a beautiful large Herefordshire apple, of a longish shape, streaked all over with a dark red; and is in eating about the middle of October.

The Red Must, which resembles the Old Red Must in shape; but is of a dark red colour towards the sun, and yellow on the other side. It is ripe about the middle of November.

The Requette Grise, which is a middle-sized fruit, of a gray colour next the sun; it is a very good juicy apple, of a quick flavour, and ripens about the latter end of October.

The Red Sweet, which is a small round apple, red towards the sun, and of a greenish-yellow on the other side. It is a good bearer, according to Forsyth, "and much esteemed among the country people of Cornwall for making a kind of tart or pie, one of their dainties at Christmas." It is a pretty good table apple, and keeps till March.

The Ribston Pippin, which is a fine apple, from Ribston Hall, near Knaresborough, in Yorkshire. It is a little streaked with red towards the sun, and yellow on the other side, being one of the best apples for eating and baking, and continues in use from the end of October till April. It bears very well as a dwarf, and no garden should be without it.

The Robinson's Pippin, which is about the size of a Golden Pippin, of a green colour, and partakes of the flavour both of a Golden Pippin and a Nonpareil. It keeps till May.

The Royal George, which is a fine large apple, of a beautiful yellow on one side and green on the other. It is a good apple, and keeps till June, but then grows mealy.

The Royal Nonpareil, which is a handsome apple, of a flatish shape, with a small footstalk and fine eye. It is about the size of a common Nonpareil, of a green colour, with red towards the sun. It is ripe in January, and keeps till the latter end of March.

The Royal Pearmain, which is a fine large apple, beautifully streaked with red. It is ripe in January and keeps till March, being a pretty good apple.

The Royal Russet, or Leather-coat Russet, which is a large fruit, and one of the best kitchen apples that we have. It is also a pleasant eating apple, and a great bearer, being in use from October to April.

The Russet Pippin, which is of a rough russet colour towards the sun, and of a green colour, sometimes inclining to yellow, on the other side. It is a good keeping apple, and fit either for baking or eating raw. It is ripe about

the beginning of February, and keeps till March.

The Red and White Calville, which are good apples, of a vinous taste; some have a red, and some a white pulp; and the white is reckoned of a most delicious flavour. They are in eating in September and October.

The Summer Pearmain, which is striped with red next the sun; the flesh is soft, but soon turns mealy; so that it is not much esteemed. It is in eating in August and September.

The Silver Pippin, which is a handsome middle-sized conical-shaped apple, of a fine yellow colour, with a faint blush towards the sun. The flesh is firm and very white, and of an excellent flavour. It keeps till the middle of May, or later.

The Seek no Farther, which is a handsome apple, rather above the middle size, of a pale-green colour, a little streaked with red. It is of a pleasant though not very high flavour; and is in eating from January to May; but is apt to be mealy when kept longer than the beginning of April.

The Sykehouse, which is a handsome middle-sized apple, from Sykehouse in Yorkshire, of an orange colour towards the sun, sometimes inclining to red, and yellow on the other side. This is a fine eating apple; ripe in January, and keeps till April.

The Stone Pippin, which is of a green colour streaked with red towards the sun. It is of a sharp taste, and is in eating from January till the middle of May.

The Stoup Codlin, which is a large handsome apple, of a pale-green colour, with a little red towards the sun. It is a baking apple, of a pleasant taste. It keeps till May.

The Striped Nonpareil Russet, which is a handsome apple, of a greenish-russet colour, with a little brownish-red towards the sun. It is about the size of a large Nonpareil, is ripe in January, and keeps till March.

The Spice Apple, which is a handsome middle-sized angular-shaped apple, of a yellow colour, and a pleasant flavour. It is ripe in January, and keeps till March.

The Skerm's Kernel, which is a conical-shaped middle-sized apple, beautifully streaked with red, deepest towards the eye, and having a good deal of yellow towards the footstalk. It is ripe in January, and keeps till March.

The Spice Rennet, which is a handsome apple, below the middle size, red towards the sun, and yellow on the other side.

The Spanish Pearmain, which is a middle-sized oblong apple, of a carnation colour, and dark-red towards the sun. It is a pretty good apple, and keeps till the beginning of May.

The Spanish Onion, which is a handsome round apple of a russet colour, with a dull red towards the sun. This apple, which is rather below the middle size, is very good for the dessert, keeping till March.

The Sharp's Russet, which is below the middle size, of a brownish-red colour towards the sun, and a pale green on the other side. It is shaped like the frustum of a cone; is of a pretty good flavour, and keeps till May.

The Spencer's Pippin, which is a middle-sized apple, of a yellowish colour, with many dark spots, being a baking apple, and keeping till the middle of May.

The Tankerton, which is a conical-shaped yellow apple, with sometimes a little blush towards the sun. It is an excellent sauce apple, and bakes well, being of an agreeable taste, but too large for the table. It will keep till February.

The Transparent Apple, which was introduced from St. Petersburg; but is more curious than useful: a tree or two, therefore, will be sufficient for a garden. It ripens in September and October.

The Treroider Renet, which is a small handsome russet-coloured apple, of an excellent flavour, and will keep till May.

The White Corpendu, which is a middle-sized long-shaped apple, of a yellowish colour. It is a good eating apple, and ripens in January.

The Ward Apple, which is a beautiful flat-shaped apple, rather below the middle size, of a fine red towards the eye, and of a yellowish-green towards the footstalk. It is a sharp-flavoured fruit, and keeps till June.

The Wheeler's Russet, which is of middling size, the flesh firm, and of a quick acid flavour; it is an excellent kitchen fruit, and keeps long. It ripens in October.

The Wine Russet, which is a middle-sized conical-shaped apple, of a dark russet colour, and sharp flavour. It keeps till the latter end of April.

The Wheeler's Extreme, which resembles the Pomme Grise, and is about the size of a Nonpareil. It is a flat-shaped apple, beautifully clouded with red on a yellowish-russet ground; is of an excellent flavour, and keeps till April.

The White Must, which is a middle-sized handsome apple, of a greenish-yellow colour, with a little red towards the sun; the flavour is rather tart, but agreeable. It is ripe in January.

The Whitmore Pippin, which is a good-sized handsome apple, streaked with red towards the sun, and of a pale yellow on the other side. It has firm flesh, of a tolerably good flavour, and is in eating from November to the latter end of April, or later.

The Wiltshire Cat's-head, which is a large handsome apple, red towards the sun, and green on the other side. It is a very fine baking apple, and of a good flavour, being ripe in January.

The Winter Pearmain, or Herefordshire Pearmain, which is of a fine red next the sun, and striped with red on the other side; the flesh is juicy, and stews well. It is fit for use in November, and if properly managed will keep till the latter end of March.

The Winter Pomroy, which is a pretty large conical-shaped apple, of a dark-green colour, a little streaked with red towards the sun. The coat is rather tough. It is a good baking apple, keeping till January.

The Winter Box Apple, which is a middle-sized fruit, of a light-green colour, and keeps till February.

The Woodcock, which is a good-sized apple, of a dark-red next the sun, and paler, with a little mixture of yellow, on the other side. It is ripe in January, and keeps till March, being a good cider apple.

The Wright's Nonpareil, which is a Salopian apple, being a great bearer, of a good size, and a little flattened. It is a good kitchen apple, and keeps till June. The tree is smaller in size than most other apple-trees.

The Yorkshire Greening, which is a good-sized flattened apple, of a dull-red colour, with a little green towards the eye. It keeps till August, or often later.

To these the following list has been subjoined, of useful Apples, for different purposes:

The Aged Pippin; the Aromatic Brooding, which is sometimes known by the title of the Summer Brooding; the Autumn Pearmain; the Barcelona Pearmain, the Beaufin, which are good for baking, and sometimes known by the names of the Lincolnshire Beaufin, the Yorkshire Beaufin, and the Norfolk Beaufin; the Black Moor, which is good for cider; the Bontradue, the Cawood Timely, which is good for eating; the Chardin's Sans-pareil, which is good for eating; the Chester Pearmain; the Costard, which is proper for cider; the Cotton Pippin, the Covadies, the Darling Pippin, the Derbyshire Crab, the Devonshire Buckland, the Double-blossom Scarlet Crab, the Dowsen's, the Dutch Paradise; the Early Nonpareil, also good for eating; the Everlasting Hanger, which is good for cider; the Eyer's Greening, also good for baking; the Frank Rambour, the Frazer's, the French Pippin, the French Paradise; the Gennet Moyle, good for cider; the Golden Doucet, the Golden Noble, the Golden Lustre, the Gray Noble, the Gray's Pippin; the Green

Blundrel, which is good for cider; the Green Pearmain, which is also proper for that liquor; the Havers's Monster, the Hay's fine large baking Apple; the Hertfordshire Under-leaf, which is fine for cider; the Hughes's New Golden Pippin, the June Keeping, the Kipling's Pippin, the Kirke's Incomparable; the Kitchen Rennet, good for baking; the Lancashire Housewife, useful in the same way; the Large Yellow Pippin, the Large Golden Pippin, good for eating, sometimes known by the name of *Baker's Golden Pippin*; the Large Apple Williamson, the Lawman's; the Lincolnshire Rennet, proper for baking; Lord Islay's Pippin, the Neal's Summer Kentish; the New England, good for baking; the New York Pippin, the Nutmeg, the Orgeline, or Orjeline; the Oxhead Pearmain, esteemed for eating, also known by the name of *Earl of Yarmouth's Pearmain*; the Pie Pie, the Pine-Apple Russet, the Pipy Russet, the Pomphilia, esteemed for eating; the Queen's Pearmain, the Red-fleshed Beaufin, the Red Vacan, the Ronald's Queen Charlotte; the Robine, good for baking; the Royal Wilding, proper for cider; the Scarlet Pearmain, the Sheppard's Russet, the Siberian Crab, the Sir Charles Wager's, the Spit, the Stout Buckland; the Striped Beaufin, which is good for baking; the Stubbard; the Styre, proper for cider; the Summer Redstreak, which is also used in the same way; the Summer Pippin, the Summer Russet; the Summer Colman, which is good for baking; the Summer Majetin, the Ten Shillings, the Tom Two Years Old; the Transparent Codlin, esteemed for baking; the Virgin; the White Pippin, good for eating; the White Sour, the Welch Lemon Pippin, the Whykins's Pippin, the Wine Sop; the Winter Redstreak, esteemed for cider; the Winter Colman, good for baking; the Winter Brooding, also proper for baking; the Winter Majetin, and the Yellow Buckland.

The sorts of apples advised for a small garden are the following: The Juneting, the Golden Pippins, the Nonsuch, the Ribston Pippin, the Nonpareils, the Queen's Apple, the Sykehouse, the Golden Rennet, the Aromatic Pippin, the Gray Leadington, the Scarlet Pearmain, the Lemon Pippin, the Pomme Grise, the French Crab, and different sorts of Russetins and Codlins, for baking.

There are other varieties and sub-varieties that may be equally valuable with many of the above.

The third is a tree which, when it blossoms in perfection, is highly ornamental. It blossoms about the end of April or beginning of May. The flowers are large, of a pale red when open,

and semi-double; the buds are of a much deeper hue. The fruit is sparingly produced, and of little value. It is probably a native of China.

The fourth species has a strong woody stem, sending out many side-branches, and covered with a smooth brown bark. The leaves are shaped like those of the cherry-tree; are of a deep green on their upper side, but paler on their under, slightly serrate, and on long foot-stalks. The flowers come out in bunches from the side of the branches on long slender peduncles; the petals are white, and shaped like those of the first sort, appearing in April; and are succeeded by roundish fruit, about the size of large Duke cherries, changing to a yellowish colour variegated with red, of a very austere taste, decaying like the fruit of the Medlar, and then more palatable. It is supposed to be a native of Siberia. There are varieties in the size of the fruit.

The fifth has the umbel on smooth peduncles. The calyxes are smooth on the outside; tomentose within: the leaves like those of the Apple, but more smooth, and more finely serrate, longer and narrower, and cut into acute angles on their sides. The flowers have a fragrant odour. It is a native of America, where the inhabitants plant them for stocks to graft apples upon. It flowers here in May.

The sixth species is a low crooked and distorted tree, covered with a brown bark, and much branched. The leaves are roundish or ovate, entire, above dusky green, underneath whitish, on short petioles. The flowers large. Corolla pale red or white. The calyx spreading, serrate, the length of the corolla. The fruit a pome, varying in shape in the different varieties—globular, oblong or pear-shaped. It is supposed a native of Austria &c.; flowering in May and June.

There are the following varieties:—The Pear Quince, with oblong-ovate leaves, and an oblong fruit lengthened at the base; the Apple Quince, with ovate leaves and a rounder fruit; the Portugal Quince, with obovate leaves, and an oblong fruit which is more juicy and less harsh than the others, and therefore the most valuable.

The Quince is a very beautiful tree when in flower, as well as when the fruit is ripe in the autumn, and was cultivated in this country at a very early period. According to Mr. Forsyth, "the best sort for planting in the fruit-garden is the Portugal, being the fittest for baking or stewing. It is of a fine purple colour when dressed, and is much better for marmalade than any of the other sorts. The oblong kind, and the Apple Quince, are also planted," he says

"in these situations, and other sorts are employed in the shrubberies for producing variety."

The above sort is likewise valuable for mixing with apples in making pies, puddings, &c. as they add a quickness to the flavour when flat.

Culture in the Pear kind.—These trees are raised by grafting and budding upon any kinds of pear-stocks; occasionally upon quince-stocks, and sometimes upon white-thorn stocks; but the first sort are preferable for general use to have large trees, and the second for moderate growers.

The numerous varieties of these trees having been first accidentally obtained from seed, and as these seedlings rarely produce the same sorts again, the approved kinds are continued and increased only by grafting or budding upon stocks raised from the kernels of the kinds just mentioned. In order to restrain the growth of these trees white-thorn stocks have also been used; but these are not so generally successful, and are almost in total disuse in the nurseries: of course pear-stocks are proper for general use, for principal large trees, both for walls, espaliers, and standards; and quince-stocks for smaller growths. For raising the stocks, the seeds or kernels of the different sorts should be sown in the latter end of autumn, as October, November, or December, or early in the spring, in beds of light earth, covering them near an inch deep; they come up in the spring: and in autumn, winter, or spring following, the strongest should be planted out in nursery-rows to remain for grafting and budding, for which, after having from one to two or three years' growth, they will be of proper size.

The operations of grafting and budding should be performed in the usual method; the former in the spring, and the latter in summer. See **GRAFTING** and **BUDDING**. For this purpose the grafts and buds should be procured from such trees as produce the finest fruit of the respective sorts; those designed as dwarfs for walls, espaliers, or standard-dwarfs, being grafted or budded near the bottom; and in those for half and full standards, the stocks may either be previously trained up from three or four to seven or eight feet high to form a stem, then grafted near the top, or be grafted low in the stock, like the dwarfs, and the first main shoot trained for a stem the above height: the grafted trees, both dwarfs and standards, shoot the same year, but the budded ones not till the spring after; and when their heads are two years old from the grafting and budding, they may, if thought proper, be planted out for good, or remain longer in the nursery, as may be found convenient.

The dwarfs for walls, espaliers, &c. whether they remain longer in the nursery, or be transplanted at a year old into the garden, should have the first shoots from the graft or bud, when a year old, headed down in March to five or six eyes, to force out a proper supply of four, six, or more lateral branches near the ground, to furnish the wall or espalier with bearers quite from the bottom, these readily producing others to cover the upper part.

Standards, supposing them to be grafted on high stocks, may either be headed near the top of the stock, or permitted to run up, as the case may require, so that if shortened it will force out laterals near the head of the stem, and form a more spreading full head; and if suffered to run up with the first shoots entire, they form higher and generally more upright heads in the end. Such standards, however, as are grafted or budded as low in the stock as for dwarfs, must have the first shoot trained upright at full length, six or seven feet high for a stem; if for full standards, they may either be topped at six feet height, to force out laterals near that part to form a spreading head, or suffered to run and branch in its own way to form a more erect and higher head.

The headed trees, both dwarfs and standards, on being cut down in the spring, soon branch out from all the eyes immediately below; when care should be taken during the summer to trim off all shoots from the stem, suffering all the top shoots to remain entire; when they will form handsome beginning young heads by the end of summer, and in autumn, winter, or spring following, may be finally planted out into the garden, &c.

When from necessity they are retained longer in the nursery, the whole should have proper pruning to reform irregular growths, and the different trees be trained accordingly, suffering the whole to branch away at full length, not shortening any after the above general heading down, when a year old, except it should seem occasionally necessary, either to reduce any casual irregularity, or to procure a more full supply of lower branches; after which no further general shortening should be practised to these sort of trees; for, after having obtained a proper set of regular branches near the head of the stem, they readily furnish more in their turn to increase the head on the upper part.

In regard to planting out the trees, they are mostly of proper growth for this purpose when from one or two to four or five years old, from the graft or bud; but if larger trees are required, those of six or eight years old may be safely

transplanted; younger trees, however, always succeed well, even when only two or three years old.

In selecting pear-trees for planting, Mr. Forsyth advises the choosing of the oldest trees that can be found instead of the young ones, and such as have strong stems; to have them carefully taken up, with as much of the roots as possible, and carefully planted, after cutting in the roots a little, spreading them as horizontally as can be done. Then to fill up all round the roots with light dry mould; forcing it in, about those which lie hollow, with a sharp-pointed stick; filling the whole up to the top without treading the mould, till the hole be first filled with as much water as it will contain, leaving it a day or two until the ground has absorbed the water; then to throw on some fresh dry mould and tread it as hard as possible, filling the hole up again with mould to within an inch of the top, and giving it a second watering, leaving the mould about three inches higher than the border, to settle of itself, and to receive the rain that falls, for at least a month. When the mould has become quite dry, it may be trodden a second time; then make a large bason all round the tree, and giving it another watering, mulching the top over with some rotten leaves or dung, continuing to water the trees once a week in dry weather, and sprinkling the tops frequently with a pot, or hand engine, to keep the wood from shrivelling till they have taken fresh root:—and where the trees are planted against a wall, the stems should stand sloping towards it; the lower parts of them being six inches from the bottom of the wall, to give them room to grow, as when planted close to the wall at bottom, the stems, in growing, will, he says, be confined on the back, grow flat, and be very unsightly. If any roots are in the way, to hinder it from being planted near enough to the wall, they must be cut off; at the same time taking care that the tree does not lean to either side, but that, when viewed in front, it appear perfectly upright. Sometimes standards and half-standards are, he says, seen planted a foot or two from the wall, which gives them a very disagreeable appearance: six inches is, he thinks, quite sufficient. Much care should be taken not to wound the stem or root of the tree in planting.

When young trees have two stems, he advises always to cut off one of them, leaving the stoutest and straightest, planting that side outwards which has most buds on it.

It is added, that when the buds begin to break well, the trees should be headed down to three or four eyes, to fill the wall with fine wood, but never afterward, except the leading shoot to fill the

VOL. II.

wall, leaving the fore-right shoots to be pruned, as hereafter directed. He has "had some trees that had forty pears on them the second year; while some of the same kind bore only eleven pears the fourteenth year after planting, with the common method of pruning."

When such old trees as recommended above cannot be procured, the stoutest and cleanest of the one-year's old after grafting should, he says, be provided.

Where any of these trees become stunted after a number of years, they should be headed down as hereafter directed, which will bring them into fresh vigour and fruitfulness.

The proper season for planting them out is any time in open weather from the end of October till March, but the autumn or early winter are the most advantageous periods.

They succeed well in any common garden soil, or good fertile orchard-ground, or field, that is not very wet, or of a stiff or stubborn quality, but moderately light and friable to the depth of one spade at least, and if more the better. The ground should be prepared by proper trenching one or two spades deep, as the depth of good soil will admit, wholly if for a full plantation, or only along the place for each row of trees, in the place for each tree; or only a hole for each tree at proper distances.

The proper distance for planting the dwarf sorts for walls or on espaliers, is for those on free stocks at not less than twenty feet, but if twenty-five, or more, the better, especially if the walls be rather low, &c. that there may be full scope to extend their branches considerably in a horizontal direction, as they will effectually fill that space, or even much more if it be allowed them; but they are often planted much nearer together. It is however of importance to give these trees sufficient room, and the higher the walls the better, as is evident by those trees growing against the ends of high buildings, as they extend themselves very considerably every way. Some plant cherry-trees or other moderate shooting fruit-trees in the intervals for a few years, till the pears advance in growth and approach one another, when they should be removed. They are to be planted in the usual way, with their heads entire. See PLANTING.

But for trees that are dwarfed by grafting or budding upon quince-stocks, from fifteen to eighteen feet may be a proper distance for planting, either for walls or espaliers.

In respect to the distance at which pear-trees should be planted against walls, it is observed by Mr. Forsyth that when they "are grafted on free stocks, such as Colmars, Pear D'Auche, Crasanes, L'Eschasseries, Virgouleuses,

2 S

and Winter and Summer Bonchrétiens, it should be at least twelve yards distant from each other, supposing the walls to be from twelve to sixteen feet high; but when they are only ten feet, fifteen yards will be little enough for the purpose."

Where they are planted on south walls, vines, peaches, nectarines, or apricots, may be planted between them, till the trees extend so far as nearly to meet each other: then they may be removed to any other situation in the garden where they are wanted. And where the pears are planted on west walls, the same sort of trees may be planted between them as on south walls; the fruit on a west aspect will, he says, come into use to succeed that on the south. On an east wall different sorts of plums and cherries may be planted, he says, between the pear-trees till they almost meet, then transplanted as standards or wall-trees.

He advises that the borders for pear-trees in a large garden should not be less than from ten to twenty feet wide, with a foot-path about three feet from the wall, covered over at top with coal-ashes or road-sand, to make a dry walk for getting at the trees to cut and nail them, to gather the fruit, &c. And that the depth of the mould for them should never be less than three feet, laying the best mould at top, to encourage the roots to come as near the surface as possible. If the bottom be clay, it will, he says, be very necessary, once in every five or six years, to open the ground round the roots of the trees, and cut off all the large ones that are inclining to run into the clay; as by this practice the trees will throw out fresh roots that will run near the surface, provided the mould is good near the top of the borders.

He suggests that a crop of early peas, lettuces, spinach, or any other small crops, may be grown on the borders, during the winter and spring; but no late crops by any means. If the ground can be spared, he would advise to have no summer crops, but keep the borders hoed, in particular after rain; otherwise the ground, if a strong loamy or clayey soil, will be apt to crack in dry weather; but by frequent stirring between wet and dry this will in a great measure be prevented, and the sun's rays admitted into the mould, which will greatly heighten the flavour of the fruit. When you can conveniently spare the borders in winter, they should be ridged up to sweeten the mould, which may be very well done if you sow early peas on the sides of the ridges; which is by far the best way to preserve the peas from the frost, and to prevent them from rotting, which will sometimes happen, if the land be strong, before they begin to vegetate: or, you

you may sow an early crop of carrots or spinach on these borders.

In regard to the general management in the training and pruning of these trees, if the young wall and espalier trees thus planted are only one year old from the graft or bud, having their first shoots of a year-old entire, these should in the spring be headed down to five or six inches, to force out lower horizontal branches; but if they have been previously headed, as advised above, and have thrown out laterals to form a regular set of horizontal branches, consisting of six or more near the bottom, they should not now be shortened, but trained to the wall or espalier at full length horizontally, preserving an equal number on each side five or six inches asunder: they will readily emit a further supply of horizontal shoots to cover the wall, &c. regularly upward, and at the same time not being shortened, they gradually form themselves for bearing, as every shortening of the branches of these trees retards their bearing a year at least: if, however, there is a want of branches, some of the middlemost may be pruned short, and trained to the wall or espalier. According as the trees shoot in summer, a further supply of all the regular shoots in every part where they occur, should be trained in at full length, unless it shall seem necessary to prune some strong shoots to obtain a greater supply of horizontal branches the same year, in order to furnish the head as soon as possible: at this time, however, displace all the fore-right and other irregular growths of the year, continuing the supply of regular shoots close to the wall, as they advance in length during their summer's growth. And in the winter pruning, the supply of shoots attained in summer should be well examined, selecting all those that are well placed and properly situated for training in, to increase the number of horizontal branches on each side, which should be left wholly entire, and at the same time retrenching any superfluities and ill-placed shoots omitted in summer; then the whole supply of regular horizontal branches in every part should be trained in straight and close to the wall or espalier, equally on both sides of the tree, every branch at the full length, at four, five, or six inches apart. See WALL- and ESPALIER-TREES, and PRUNING.

There is another method sometimes practised in training these trees for walls and espaliers, which is, that after their first heading down and having thrown out several laterals, to select three of the strongest and most regularly placed, one on each side and one in the middle, nailing the two side ones horizontally at full length, and the middle one upright; the tree having produced a

further supply of shoots in the following year, add two or four of them as side branches, arranging them on each side of the stem as the two former, training the middle shoot still in an upright direction; observing that where it does not furnish horizontals low enough, it may be shortened so as to make it throw out shoots at any requisite height, continuing the middle one always upward for a stem, and the side ones for bearers.

In either of these methods of training the trees, continue yearly increasing the number of horizontal shoots, till the full space of walling or espalier is regularly covered with bearers at equal distances, constantly continuing them all at full length, as far as the scope of walling, &c. will permit; as they naturally form fruit-spurs at every eye, almost their whole length, and the same branches continue in a fruitful state a great length of time.

When the trees have once filled the wall or espalier with branches, they need but very little further supply for many years, and that only occasionally, according as any worn-out or decayed branch occurs, and wants renewing with young wood. See PRUNING.

In the after-prunings in the summer, which should be begun in May, or early in June, rub off all the superfluous and unnecessary shoots of the year, and all fore-right and other ill-placed shoots, retrenching them quite close, being careful to leave the terminating shoot of every horizontal or bearer entire; and reserving here and there a well-placed shoot towards the lower parts in particular, and where there are any apparent vacancies, to train up between the mother branches, till winter pruning, when if not wanted they must be retrenched.

In the winter pruning, which may be performed any time from the fall of the leaf until March, the branches should be generally examined to see if they are any where too much crowded, or trained irregularly; and where any such occur, they should be regulated as they may require; and where there are any vacancies, some contiguous shoots, reserved in the summer dressing, should be laid in, and all the other shoots not wanted must be cut clean out close to the branches, being careful still to preserve the terminating shoot of every branch entire, in all parts, as far as the allotted space admits, likewise all the fruit-spurs in every part, fastening in all the branches regularly at full length.

In pruning old trees at this season, where decayed and worn-out branches occur, they should be cut out, and young wood trained in its stead; likewise, where any branch, through age or any

other defect, is become barren or worn out, it should be retrenched, and some eligible lower young branch or shoot be laid in in its place.

Where any of the choicer sorts of these trees are become worn-out and barren, they should be renewed with young bearers, by heading the branches wholly down near the bottom in winter or spring, when they break out in the old wood, and in the following summer furnish a large supply of strong young shoots, which should be trained according to the rules already laid down, when they will soon form a sort of new tree, and bear good fruit.

After each winter-pruning, the trees which are against walls and espaliers require a general nailing, &c., which should always be done with great regularity. See WALL-TREES, and ESPALIER-TREES.

The mode of training dwarf standard trees of this sort is shown in speaking of trees of that kind. See DWARF TREES.

In respect to the culture of the borders where this sort of wall- or espalier-trees are growing, it is commonly digging them once every year, adding manure occasionally in common with the other parts of the garden; but if some good rotten dung be applied every other year, and the ground well dug or trenched every winter, it greatly promotes the size and perfection of the fruit.

In regard to standard-trees of this kind, any of the sorts bear plentifully in any open situation, though the fruit may not always be so large and fine as those of wall- and espalier-trees: summer and autumn pears however ripen in great perfection on standards, as also most of the common winter pears. In planting them, trees of from two or three to four or five years old, having tolerable heads, are of a proper age and size for the purpose, and are preferable to older trees for any general plantation. They should be planted with all their heads entire, except retrenching any very irregular-placed branch, in the usual manner of tree-planting. See PLANTING.

In their future growth they should be suffered to branch naturally, so as to form large branchy heads, suffering them all to remain entire.

The general culture of this sort of trees, in respect to pruning, is very trifling, and only required occasionally, probably only once in several years; such as the retrenching any irregular growing branches, and thinning such branches as are very much crowded, cutting out all decayed wood, and eradicating suckers from the roots and stems. See PRUNING.

Where standard-trees are situated in a garden, in which the ground is necessarily dug over and

trenched annually for the reception of the under-crops, and occasionally enriched with dung, they generally produce finer fruit than in orchards, or other places where the ground is not in similar culture.

Mr. Forsyth observes that "the method of pruning pear-trees is very different from that practised for apple-trees in general, in which the constant practice has been to leave great spurs as big as a man's arm, standing out from the walls from one foot to eighteen inches and upwards." The constant pruning, he says, "inevitably brings on the canker; and, by the spurs standing out so far from the wall, the blossom and fruit are liable to be much injured by the frost and blighting winds, and thus the sap will not have a free circulation all over the tree. The sap will always find its way first to the extremities of the shoots; and the spurs will only receive it in a small proportion, as it returns from the ends of the branches; and the fruit standing at so great a distance from the wall is too much exposed to the weather, and, of course, is liable to be hard, spotted and kernelly."

The following method, he says, he has practised where the trees were all over cankered, and the fruit small, and not fit to be sent to the table. "He cut the tops off as near as possible to where they were grafted, always observing to cut as close to a joint or bud as possible. The buds are hardly perceptible, but it can always, he says, be known where the joints, or forks, are, by the branches breaking out of the sides."

He adds, that "finding the pear-trees in Kensington Gardens in a very cankered and unfruitful state, in the years 1784 and 5, he took out the old mould from the borders against the walls, and put in fresh loam in its stead; at the same time he pruned and nailed the trees in the common way, and left them in that state upwards of eighteen months, to see what effect the fresh mould would have on them; but, to his great surprise, he found that it had no good effect."

After this trial he began to consider what should be done in order to recover these old trees. In this attempt he "began with cutting down four old and decayed pear-trees of different kinds, near to the place where they had been grafted: this operation was performed on the 15th of May, 1786. Finding that they put forth fine shoots, he headed down four more on the 20th of June in the same year (for by this time the former had shoots of a foot long), which did equally well, and bore some fruit in the following year. One of the first four that he headed down was a St. Germain, which produced nineteen fine large well-flavoured pears next year, and in the third bore more fruit than it did in its former

state when it was four times the size. He left seven trees upon an east wall, treated according to the common method of pruning, which bore the following number of pears upon each tree: Epine d'Hyver produced eighty-six pears, and the tree spread fifteen yards; a Crasane produced one hundred pears, and the tree spread fourteen yards; another Crasane produced sixteen pears, and the tree spread ten yards; a Virgouleuse produced one hundred and fifty pears, and the tree spread nine yards; a Colmar produced one hundred and fifty pears, and the tree spread nine yards; another Colmar produced seventy nine pears, and the tree spread ten yards; a L'Eschasserie produced sixty pears.

"But seven trees headed down and pruned according to his own method, leaving the fore-right shoots in summer, bore, he says, as follows, in the fourth year after heading:—a Louisbonne bore four hundred and sixty-three pears, and the tree spread nine yards; another Louisbonne bore three hundred and ninety-one pears, and spread eight yards; a Colmar bore two hundred and thirteen pears, and spread six yards; a Brown Beurré bore five hundred and three pears; another Brown Beurré bore five hundred and fifty pears; a Crasane bore five hundred and twenty pears; a Virgouleuse bore five hundred and eighty pears. And he adds that the branches of the four last trees spread nearly in the same proportion as the first three. He also states that a young Beurré, the second year after heading, bore two hundred and thirty pears; and a St. Germain four hundred. All the above trees stood in the same aspect and the same wall, and the fruit was numbered in the same year. A great many pears which dropped from the trees are not reckoned. The trees that were pruned according to the old practice covered at least one-third more wall than the other.

From this statement it appears, he says, that the trees headed down bore upwards of five times the quantity of fruit that the others did; and that it keeps increasing in proportion to the progress of the trees. This is an important statement in the culture and management of old trees of this sort; and the following fact with respect to standards is deserving of great attention:—

"On the 20th of June he headed several standards that were almost destroyed by the canker; some of them were so loaded with fruit the following year, that he was obliged to prop the branches, to prevent their being broken down by the weight of it. In the fourth year after these standards were headed down, one of them bore two thousand eight hundred and forty pears. There were three standards on the same

border with the above, two of which were St. Germain's; the old tree was of the same kind. One of these trees, twenty years old, had five hundred pears on it, which was a great crop for its size: so that there were on the old tree, which had been headed down not quite four years, two thousand three hundred and forty pears more than on the tree of twenty years growth. When the men numbered the pears, there was, he says, near a barrowful of wind-falls at the bottom of the old tree, which were not included.

These and other statements are given in his useful *Treatise on the Culture of Fruit-Trees*.

The following is the method which he pursues in training trees that are cut near to the place where they were grafted:—

“In the month of March, every year, he shortens the leading shoot to a foot or eighteen inches, according to its strength: this shoot will, he says, if the tree be strong, grow from five to seven feet long in one season; and, if left to nature, would run up without throwing out side-shoots. The reason for thus shortening the leading shoot is, he says, to make it throw out side-shoots; and if it be done close to a bud, it will frequently cover the cut in one season, leaving only a cicatrix. When the shoots are very strong, he cuts the leading ones twice in one season; by this method he gets two sets of side-shoots in one year, which enable him the sooner to cover the wall. The first cutting is performed any time during the spring, and the second about the middle of June. When you prune the trees, and cut the foreright shoots, which should be done in February or March, always cut close to an eye or bud, observing where you see the greatest number of leaves at the lower bud, and cut at them; for at the footstalk of every one of these will be produced a flower-bud. The same will hold good in cutting the superfluous shoots on standard pears.” He adds, that “you will have in some sorts of pears, in a favourable season, from five to nine pears in a cluster. This cutting should not be later than March, or the beginning of April, on account of the leading shoot beginning to grow: the next topping, when the leading shoot grows quick enough to admit of it, should be about the middle of June; and the length of the shoots should be according to their strength, having from three eyes, or buds, to fix on a side.”

It is added that “the canker part beginning to affect the new bark, he cut off all the canker at the bottom, and plastered the place with some cow-dung, mixed with wood-ashes and powder of burnt bones, put into as much urine and soapsuds as would make it of the consistence of

thick paint; this he laid on with a painter's brush. After it had been applied about three hours, he patted it gently down, with his hand, close to the tree. By so doing, he gets rid, he says, of all the air-bubbles that may be under the Composition, and makes it adhere to the tree, preventing it from being washed off by heavy rains. And in the beginning of August he shortens the foreright shoots to about four inches long; by this time the shoot will have made its full growth for the season, and will produce fine strong eyes for the following year. Such shoots as grow near the stem of the tree, if any are wanted to fill up the wall, may, he says, be tucked-in as directed for peaches. This will prevent them from looking unsightly, and save them from the fury of the autumnal and winter winds.”

He further advises, that “whenever the trunk is hollow, it be followed under ground till you have cut out all the decayed parts and rotten roots, otherwise you will lose the tree. By proceeding according to the foregoing directions, the root will, he says, be renewed, while the tree is forming a fine handsome head. In the mean-time the borders should be trenched, taking up all the old roots, and adding some fresh mould to them, if you can conveniently get it; if you cannot, remove all the sour mould that is about the roots of the trees, and put in some taken from the border, at a distance from the wall; always remembering to lay the top spit next to the roots of the trees; also, to mix some vegetable mould, from the melon and cucumber beds, with rotten leaves, as a manure for the borders.”

He has “headed down, he says, many trees that had not this preparation; and yet they thrived very well, but did not send forth such fine roots and shoots as those that were so prepared.”

He concludes by observing, that “if the above directions be followed, more pears will be procured in three or four years than can be done in twenty-five years by planting young trees, and pruning and managing them in the common way. It is added, that if it should be found, that, before the pears arrive at half their natural size, they get stunted, after cold blighting winds, and frosty nights, he would recommend a new operation to be performed when the weather begins to grow mild, which is to take a sharp penknife, and with the point of it make an incision through the rind of the pear from the footstalk to the eye, in the same way as in scarifying a bark-bound tree, taking care to penetrate as little into the flesh of the pear as possible. At the same time beat up some fresh

cow-dung with wood-ashes, and with your forefinger rub in a little of this Composition where you made the scarification; as the wound heals, the Composition will be discharged from the fruit; this will prevent the pears from cracking and bursting, which renders them good for nothing. The sorts that are most liable to this disorder are, he observes, the Colmar, Virgoultense, and Crasane. He only, however, recommends this operation for wall pears, as it may be thought by some a troublesome operation, and it will certainly take up some time."

The maturity of the pear is generally known by its changing from a green to a yellow or reddish colour, &c., and by the frequent falling from the tree, and when with a gentle twist or turn upwards, it easily quits its hold; but these signs of ripeness are more particularly observable in Summer and Autumn pears; as Winter pears not being maturely ripe when gathered, often require a good pull before they quit the branches.

The Summer pears ripen in succession in different sorts, from about the beginning or middle of July till the middle of September; many of the earliest ripening all at once, as it were, and continuing good but a few days, either on the tree or when gathered, nor will any of the sorts keep good long; and none of these sorts should hang on the tree till soft ripe, as in that case most of them would be mealy and insipid. These sorts should be gathered as soon as they are arrived to full growth, and just begin to colour and discover maturity, but before they become soft and mellow. For family use, they may be gathered from the tree according as they attain perfection; but the general crops of each sort should be always taken down before they ripen fully, and be laid in any dry room; none of the kinds will keep long, some only a few days, and scarcely any of them above a fortnight, though from different varieties ripening at different times, the succession is continued for eight or ten weeks.

The Autumn sorts ripen in different varieties, from about the middle of September till the end of October; some of the forwardest become eatable on the tree, others requiring to lie some time after being gathered before they acquire perfection. The different sorts of these pears should be gathered according as they arrive to maturity: those designed to keep some time, may be gathered in dry weather, just when they have attained full growth, as shown by their frequent dropping, and by their readily quitting the trees on being handled, and laid in a dry close room, or in baskets, each sort separately.

The Winter kinds attain their full growth on the trees about the end of October or beginning

of November; but the eatable kinds do not acquire maturity for that purpose on the tree, or for some considerable time after they are gathered, some probably in a month, others two or three, and some more, and some sorts not till the spring following. But the baking kinds may be used any time from October or November during their continuance.

All Winter pears should be indulged with as full growth on the tree as the weather will permit, even until the end of October or first week in November in the later kinds, if the season continues mild: be cautious, however, to get them gathered before attacked by much frost. And in gathering all the sorts for keeping, dry weather should be chosen, and when the fruit is also quite dry, being careful not to bruise them. See FRUIT.

Forcing of Pears.—These sorts of trees are sometimes forced by artificial heat, in some of the prime early summer kinds, to obtain a portion of fruit as early in the season as possible. This is effected by means of hot-walls and forcing frames; having previously some trees of the choicest early summer pears, such as the Jargonelle, or any other early sort, trained as wall-trees against a south wall, till advanced to some tolerable state of bearing; being then inclosed with glass frames, in the manner of forcing-frames or hot-walls, and having internally either flues for fire heat, erected forward and extending long-ways, or otherwise a pit arranged in that direction, in the interval space between the trees and the glass-work, for a bark or dung hot-bed; and by one or other of these methods a proper degree of artificial heat is produced internally to force an early growth in the trees, and forward them to early flowering and fruiting, managing them in the common way, as other trees in forcing-frames, so as to have some ripe fruit early in June, or some time in that month.

Culture in the Apple Kind.—The whole of the varieties of the apple were first accidentally obtained by raising them from the kernels of the fruit; but as these cannot be depended upon to continue the same sort of fruit, grafting is the mode made use of to increase and continue the different varieties of them, which is performed upon Crab, or any kind of Apple stocks, raised from the kernels, for dwarfs as well as standards: and sometimes upon Codlin and Paradise Apple stocks raised from cuttings and layers, when designed to have espaliers and other dwarf trees, or for small standards, as low as possible, to be confined within a moderate space: some sorts may also be raised by layers and cuttings, as the common Codlin,

The method of raising the different sorts of stocks for the purpose is, in the Crab and Apple stocks from the kernels of the fruit; but in the Codlin and Paradise stocks by cuttings and layers, to continue them with certainty of the same kinds and moderate growths. The Crab and Apple stocks may be raised from the kernels of any of the sorts, procuring them in autumn or winter, either from the fruit, or from such as have been pressed for verjuice and cider, clearing them from the grossest of the pulp; then sowing them in beds of light earth, moderately thick, over the bed, or in drills, covering them about an inch deep. They come up in the spring; when, if the season prove dry, they should be watered occasionally, to forward and strengthen the growth of the plants; and in the autumn, winter, or spring following, the largest may be planted out in nursery-rows, shortening their tap-roots a little, and placing them in lines two feet and a half asunder, to remain for grafting: after having from one to two or three years' growth, they will be fit for grafting upon, particularly for dwarfs, or even for full and half standards, if intended to form the stem from the graft, which is an eligible method for these trees; but if the stock is to form the stem, they require three or four years' growth, to rise to a proper height, seven feet for full, and four or five for half standards. The modes of grafting all the sorts is the same as for other fruit-trees, and should be performed in March, either by whip- or cleft-grafting, according to the size of the stock. See **GRAFTING**.

Having provided proper grafts of the different sorts of apples intended to be raised, the stocks designed for dwarfs of all sorts must be grafted within six inches of the ground; and the standards may also be grafted low, one shoot from the graft being trained up for a stem, or on tall stocks, at five or six feet in height, but for low and half standards, at two or three, to four or five feet, and lower for dwarf standards. The grafts of all the sorts shoot the same year; and by the autumn following, the trees having formed little heads, consisting of two, three or four shoots, may then be planted out finally where they are to remain, or be retained a year or two, or longer, in the nursery, as may be requisite, training them for the purposes intended, as dwarfs, espaliers, &c., &c., and uprights for standards, heading the dwarfs down in March following, within six inches of the graft, to force out more lateral shoots below to form a fuller head, proceeding immediately to turn them near the bottom, so as to fill the espalier, &c., equally with branches, quite from within six or eight inches of the ground, regularly upward. In

the standards, those grafted low must be trained with one shoot upright, at full length, for a stem, five or six feet high at least, for full standards, before it is topped; though if grafted on tall stocks of height sufficient for a stem, the shoots from the graft may either be headed to five or six eyes; or, if to form a more spreading head, remain entire, and aspire more in height, and assume a more upright growth: in all the modes of training, care should be taken to keep the stems clear from all lateral shoots, displacing all such as soon as they appear, encouraging only a proper set of branches at top to form the head.

When these trees have heads from one to two or three years old from the graft, they are of a proper age for final planting out; though trees of four or five years old will also succeed very well, and even those of six or eight years' growth may also be safely planted if required.

The nursery-grounds are mostly furnished with all the varieties of these trees for sale, either quite young from the graft, or trained of several years' growth.

In choosing the different kinds of trees for planting, care should be taken to have a collection of the principal varieties, both in espaliers and standards, in proportion to the extent of ground, as the trees of the best sorts are as easily raised and cultivated as the indifferent ones, allotting a smaller portion of the summer kinds, as such as ripen from August to about the middle of September, for immediate use off the trees, as they will not keep long; a larger supply of the autumn sorts, and most of all of the principal winter keeping apples: observing, in the summer kinds, that it is advisable to allot a principal supply of the common Codlin in small standards, as being generally both a great bearer, and the fruit the most useful of the summer apples for culinary purposes, from its young green growth in June or July, till its full maturity in August and September, when it becomes also a good eating apple: and as the tree is a moderate grower, it admits of being planted in small standards closer or more abundant in a small extent of ground than most of the principal apple kinds.

In choosing apple-trees from the nursery, they should, Mr. Forsyth says, have strong, straight, and clean stems. And he advises not to suffer the dwarf-trees to run higher than twelve feet, as otherwise they become naked at bottom, the fruit is liable to be blown down, and the tops broken by high winds.

The proper season for planting all the sorts of apples is in mild weather, from the end of October till March; but when planted in autumn,

or early in winter, they establish themselves more firmly before the drought of the following summer.

They succeed in any common soil and open situation, except in low very moist land, in which they are apt to canker, and soon go off: in a pliable mellow loam they generally answer very well. The ground should be properly prepared, by good trenching, where the ranges of trees are to stand.

In the planting of Espalier Apple-trees they should be ranged at not less than eighteen or twenty feet distance; the latter especially for trees grafted on Crab or Apple stocks, which being free shooters, the branches readily fill that space. For the trees grafted on Codlin and Paradise stocks, fifteen or eighteen feet may be sufficient; though the latter, in particular, is sometimes planted only twelve or fifteen feet asunder, as being a very moderate shooter: it is, however, advisable to allow every sort full room, according to their growth, to have proper space to extend their branches always at full length. The trees should be planted with all their heads entire, only retrenching any very irregular growths, that do not range consistently with the intended form, and pruning any broken roots. Then having opened a proper hole for each tree, plant them in the usual manner, being careful to place them with their branches ranging the way of the espalier. As soon as the earth of the holes and of the roots is properly settled, all the branches should be trained in horizontally to the right and left, an equal number on each side, at full length, as above.

The general culture in espalier trees thus planted and trained, as the same branches or bearers continue fruitful many years, is to continue them as long as they remain of proper growths, constantly giving them a summer and winter pruning annually, as explained above.

In wall-trees also, any of the principal choice varieties of eating-apples may be trained, to forward and improve the growth, beauty, and flavour of the fruit; such as Jennetings, Margaret-apple, Golden-pippins, Golden-remnets, Pear-mains, &c., or any other approved eating kinds, a tree or two of a sort, against a south or south-west or east wall.

Standard apples when planted in the garden should be arranged thinly, to admit of under-crops growing freely, without being shaded by their spreading branches.

Full standards should be chiefly planted for the general crops, and half and dwarf standards for variety.

The standards, when trained as above, should be planted out with all their heads entire, when

in the kitchen garden, at thirty feet distance in the rows; and for an orchard thirty feet distance every way. In planting, for each tree a wide hole should be opened, trimming any long straggling and broken roots, leaving all the others entire, and planting them with the usual care. As soon as planted out, every tree should be well staked to support them firmly upright, and prevent their being disturbed in rooting by winds. See ORCHARD and PLANTING.

Smaller growing standards, such as Codlins, or other low standards grafted upon Codlin stocks, and dwarfs upon these or Paradise stocks, may, if required, be planted only at fifteen or twenty feet distance in the rows, and not less than twenty or twenty-five feet between the lines of trees; though, if there be room to allow a greater distance both ways, it will be advantageous, especially in planting in kitchen gardens, in which it would be proper to allow double that distance between the rows of trees, of the larger growths of these kinds.

The standards thus planted with their heads entire, should be suffered to advance with their branches at full length, and in general take their natural growth, when they soon form numerous natural spurs in every part for bearing.

In respect to pruning these standards, little is required, only the occasional retrenching any very irregular cross-placed bough, or the reducing to order any very long rambler; or when the head is become greatly crowded and confused, to thin out some of the most irregular growths, likewise all strong shoots growing upright in the middle of the head, and all dead wood, and suckers from the stem and root.

As to half and dwarf standards of these trees, they may be dispersed in different parts of the garden to cause variety, managing them as the full standards.

The former on dwarf Paradise stocks, being very moderate shooters, may be planted in a little compass; and are sometimes planted in pots for curiosity, to place on a table, amidst a dessert, with the fruit growing on them. See DWARF TREES.

It is observed by Mr. Forsyth, that "in heading down old decayed apple-trees, for the sake of symmetry, it will be necessary to cut at the forked branch as near as can be to the upper side of the fork, cutting them in a sloping manner to carry off the wet, at the same time rounding the edges. To begin at the lower branches, cutting just above the lower fork; and proceeding upwards, cutting the rest of the branches from one to six joints, or forks, according to their strength, till you have finished cutting-in the whole head. If any of these branches should have the canker,

all the infected part must, he says, be cut out. When the tree is all prepared, the Composition should be immediately applied, beginning at the top of the tree, and finishing with the powder of wood-ashes and burnt bones as you descend, which will save it from being rubbed off during the operation; and the Composition will prevent the sun and air from injuring the naked inner bark. A tree thus prepared, will, he adds, in the course of three or four years, produce more and finer fruit than a maiden tree that has been planted upwards of twenty years."

These directions, if properly attended to, will be sufficient, he thinks, to enable any one to bring old decayed trees into a healthy bearing state.

He supposes, that in large orchards and gardens, it may be necessary, at first, to head down only every other tree; cutting some of the branches of the rest, which are in a decayed and cankerous state, and which bear no fruit. This will, he says, be preparing them to throw out new wood, and furnish the tree much sooner with bearing branches. He recommends the performing the operation as early as possible; as by so doing the wood will be the stronger, as in May, or the two following months.

He adds, that when the trees are become hollow, the same method should be followed as directed for plums; but by no means to cut them down unless the tops are quite decayed; observing to cut the loose rotten wood clean out of the hollow and other decayed parts, applying the Composition; at the same time to open the ground, and cut out all the rotten parts that may be found in the lower part of the stem, together with all the decayed roots, which, if this be not done, will infallibly injure the fresh wood and bark, and prevent a cure from being effected. He would recommend heading down all apple-trees that are much cankered and have ill-shaped heads; as by so doing much labour will be saved, and the trees will amply pay the proprietor. He advises never to shorten the young branches, except they are very thin, when it will be necessary to do so to fill the trees with young wood: nor prune any of the young shoots the second year (he means the year after they are cut), as many of the eyes, almost to the end of the shoot, will, if it be strong, become fruit-buds next year; and so on every year. He says, that in the month of May in the first year after the trees have been so cut, it will be necessary to go over them, and rub off with your finger and thumb all the superfluous young shoots; leaving from three to six eyes on each shoot, according to the size and strength of the branch cut. These shoots will bear from three to four years; by which time they will be pretty much exhaust-

VOL. II.

ed by the great quantity of fruit produced from them: they should then be cut down to two eyes to produce new wood. He always leaves three different years' branches on the tree, when the first shoot is cut off. This is fully shown in a plate in his useful work; and the next shoot will be full of fruit-buds, if it has not been shortened: when it begins to grow weak, it should be cut off; and the next cutting must be made when the former branch is tired of bearing: by proceeding thus all over the tree with care and attention, the advantages of this method of pruning, above the common mode, will, he says, soon be perceived; as by it you will be able to keep the trees in a constant state of bearing, which, if left to nature, would only produce a crop of fruit once in two or three years. When the shoot that has done bearing is cut off, the Composition should constantly be applied, rubbing off the shoots where they are too numerous.

He thinks the best time to prune apple-trees is in the month of April, or in May, after the operation has been performed on the peaches, nectarines, and cherries: and that soon after this pruning, about the middle of May, it will be proper to look over the trees, and to pick off any caterpillars that may be on them. It will then be seen what shoots are infected with the canker, and which might have escaped your notice at the time of pruning; and wherever you observe the least appearance of infection, which may be known by the wood appearing of a brownish colour, the shoot must be cut down till you come to the sound white wood.

The small shoots that cross each other should be cut off, leaving the strongest to fill up the tree, and make a fine handsome head. The suckers that spring from the root should be carefully grubbed up, and the side-shoots from the stem cut off; for, if left to grow, they greatly weaken the tree. The knobs, where old branches have been cut off, should also be pared away, leaving the surface of the tree as smooth as possible: after which, the Composition should be applied: the young bark will soon, he says, begin to grow, and by degrees cover the old wounds with a fresh smooth surface, and thus prevent the canker from gaining ground on the tree. He has seen some old wounds of considerable size healed over in one year: and he adds, in confirmation of the utility of this practice, that "the trees which he pruned and dressed, as above directed, in the course of the summer, 1795, are all perfectly cured, the wounds being filled up with sound wood, and covered over with new bark: they all continue in a healthy state, and bear fine handsome fruit." And he has advised several nurserymen to follow the practice, head-

ing down their apple-trees after the season of drawing for sale is over. Messrs. Gray and Wear have headed a great many of such trees as were formerly thrown to the faggot-pile, and have been amply recompensed for their trouble. Trees thus headed down, provided the stems be strong, will, he thinks, in the first and second year, produce as much fruit as will refund the purchase-money; besides, a great deal of time will be saved, which would be lost by planting younger trees: as, where you can procure trees of the above description that have been headed down three or more years, they will be all covered with fruit-buds; and, if carefully taken up and planted in the autumn, if the season proves favourable, they will have a tolerable crop of fruit the first year. Such trees must not be headed down like maiden-trees, but only thinned off where the branches run across and rub against one another, which should never be suffered in these cases.

He says, he would never recommend training apple-trees as espaliers; as by doing so the air is kept from the quarters of the garden; and by constant pruning and cutting off all the side-shoots which you cannot tie to the espaliers, you prevent them from bearing, and, moreover, bring on the canker.

And when the dwarf trees have handsome heads, more and much finer fruit will be gotten; he says, from one of them than from six espaliers; at the same time, a free air is admitted to the crops in the quarters, and the constant expense of stakes and labour, in laying the trees to the espaliers is saved. Espaliers may, he observes, be converted into dwarf standards by shortening the branches at different lengths, so as that they may be able to support themselves without the stakes; but not to shorten them all regularly; and if cut with judgment, as near to a leading shoot, or an eye, as possible, they will in the course of two years form fine heads, and in the third year bear six times as much fruit as they did in their former state, and of a finer flavour. The same method of pruning as already laid down for standard apple-trees is also applicable to espaliers.

He observes, that "the borders where you make your crossings in gardens should be six or eight feet broad at least, to let the trees spread on each side, at the distance of twelve feet from tree to tree, and they should be well trenched, two feet and a half deep at least. If there should be gravel, or sour clay, it must be taken out, and good mould put in its place; leaving the ground as rough as possible for the frost and rain to mellow it. When you level the ground it should be done after rain: you may then sow

some small crops in the borders; such as lettuce or spinach, or cabbage for transplanting; but let not any of the Brassica tribe come to full growth. Leaving cabbage and brocoli on borders, near fruit-trees, draws the ground very much, fills the borders with insects, and also prevents the sun and air from penetrating into the ground. And when the sun can have free access to the border, it adds much to the flavour of the fruit. If you can spare the ground on the cross-borders in winter, it will be of great service to the trees to ridge it up as loose as you can, and let it lie in that state all winter, to mellow and sweeten.

Where the soil is strong, he would recommend planting of apple-trees that are grafted on Paradise stocks; but if the soil be light, free stocks will do much better; and when the ground is a strong clay or brick-earth, it should be mixed with old lime-rubbish or coal-ashes, street-dung, or sand: but what he uses for the borders against the walls, and which he prefers to every other manure, is a vegetable mould produced from leaves of trees.

Of this a good coat should be given once in two or three years, which will be sufficient, he thinks, for the borders where the wall-trees stand, and much better than dung, which he by no means approves of for trees, unless it be perfectly rotten and mixed up with mould.

In respect to grafting old apple-trees, he says, "it frequently happens, that, through some mistake or other, after waiting ten or twelve years for a tree to come into a bearing state, it is found that the fruit is neither fit for the table nor kitchen; in such cases they should always be grafted the following spring, observing to graft on the finest and healthiest shoots, and as near as possible to the old graft, and where the cross-shoots break out; as by so doing you will have some fruit the second year; and in the third, if properly managed, you will have as much as on a maiden-tree of fifteen years standing: the canker, if any, must be carefully pared off the branch, and the scion must be taken from a sound healthy tree. Whenever an incision is made for budding or grafting, from that moment the canker, he says, begins. He would, therefore, recommend to those employed in budding or grafting, as soon as the incision is made, and the bud or graft inserted, to rub in with the finger, or a brush, some of the Composition before the bass is tied on; then to cover the bass all over with the Composition as thick as it can be laid on with a brush, working it well in. If this operation be performed in a proper manner, and in a moist season, it will answer every purpose, he says, without applying any grafting-clay: as he has frequently done it, and found it

succeed perfectly to his wishes. The matting which is wrapped round the bud should not be slackened too soon; for in that case you will find the incision opened, which very often occasions the death of the bud. If, says he, nurserymen and gardeners would give this method a fair trial, and use the same composition as he uses for curing defects in trees, instead of loam and horse dung (which bind so hard as to prevent the rain and moisture from penetrating to the graft to moisten the wood and bark), they would find that the grafts would succeed much better. The composition, for this purpose, should, he says, be rather softer than grafting-clay generally is; and, instead of applying so large a mass as is generally done of clay, it need not, in most cases, be more than two or three inches in circumference, to effect the purpose.

Apples come to full growth in different sorts successively, from July until the end of October: the summer kinds continue but a short time, but the autumn- and winter-apples keep from two or three to six or eight months, in different varieties. The signs of perfection or full growth of the different sorts of apples, are by their assuming a lively colour, emitting a fragrant odour, frequently falling from the tree, and by quitting their hold easily on being handled.

In the gathering of all the sorts of apples for keeping, dry weather should always be chosen, and when the trees and fruit are also perfectly dry: observe likewise in gathering apples for the table, and all kinds of apples designed for keeping any considerable time, that they be pulled one and one by hand. See **FRUIT**.

The other species may be increased by grafting and budding them upon the common Crab stock: they should have sheltered situations, as they are rather tender while young. These trees afford ornament and variety in the clumps and shrubby parts of pleasure-grounds.

Culture in the Quince Kind.—These trees may be raised from the kernels of the fruit sown in autumn; but there is no depending on having the same sort of good fruit from seedlings, nor will they soon become bearers. But the several varieties may be continued the same by cuttings and layers; also by suckers from such trees as grow upon their own roots, and likewise be increased by grafting and budding upon their own or Pear-stocks raised from the kernels in the same manner as for apples.

The raising by cuttings, layers, and suckers is performed in autumn, winter, or spring, choosing young wood for the cuttings and layers, which should be planted and laid in the common method, when they will be rooted by the following autumn, then planted out into nursery rows two feet asunder; plant the suckers also at the same

distance, and there training the whole for the purposes intended: if for standards, run them up with a stem to any desired height, from three to five or six feet, then encourage them to branch out at top, to form a head; and those designed as dwarfs must be headed near the ground, and trained accordingly for espaliers, or dwarf standards, as directed under those articles: the grafting or budding is effected on Quince- or Pear-stocks, and trained as above.

When they have formed tolerable heads, they should be planted out finally.

Mr. Forsyth advises that the layers or cuttings should be planted in a shady place, in rows at about a foot distant from each other, and about three inches from plant to plant in the rows; mulching them with rotten leaves, or rotten dung, which will keep the ground about them moist; and watering them frequently in hot weather. About Michaelmas those that are well rooted may be planted out, and those that are not should remain another year. They may also be propagated by budding or grafting; and these trees will bear sooner, and be more fruitful than those raised by any other method.

He observes, that the quince-tree may be pruned much in the same way as an apple-tree, taking care to cut out all the old diseased and dead wood, and the cross branches in the middle of the tree, which are apt to injure each other by friction. In general you will find old trees much hurt by injudicious pruning: in that case they should be headed down, cutting out all the canker parts, and also all the diseased and dead wood where the tree is hollow, or where large branches have been cut or broken off; applying the composition as for apple-trees: and as quince-trees are very apt to have rough bark, and to be bark-bound, in these cases it will be necessary to shave off the rough bark with a draw-knife, and to scarify them when bark-bound, brushing them over with the composition.

It is also advised to plant quince-trees at a proper distance from apples and pears, as bees and the wind may mix the farina, and occasion the apples or pears to degenerate.

Standard quinces, designed as fruit-trees, may be stationed in the garden or orchard, and some by the sides of any water, pond, watery-ditch, &c. as they delight in moisture, suffering the whole to take their own natural growth: and as espaliers, they may be arranged in assemblage with other moderate-growing trees, such as apples and pears on paradise and quince-stocks, cherries, &c. being trained as directed for apples and pears in espaliers. They may also be planted in shrubberies either as full or low standards, and permitted to take their own way of growth. See **ORCHARD**.

QUEEN'S GILLIFLOWERS. See HESPERIS.

QUERCUS, a genus furnishing plants of the forest deciduous evergreen ornamental tree-kinds.

It belongs to the class and order *Monoecia Polyandria*, (*Enneandria Monogynia*, *Octandria Tetragynia*), and ranks in the natural order of *Amentaceae*.

The characters are: that in the male flowers the calyx is a filiform ament, long, loose: perianth one-leaved, subquincifid: segments acute, often bifid: there is no corolla: the stamens have from five to ten filaments, very short: anthers large, twin; females sessile in the bud, on the same plant with the males: the calyx is an involucre, consisting of very many imbricate scales, united at the base into coriaceous hemispherical little cups; the outer ones larger, one-flowered; permanent: perianth very small, superior, six-cleft, permanent: segments acute, surrounding the base of the style, pressed close: there is no corolla: the pistillum is a very small germ, ovate, inferior, three-celled: rudiments of the seeds double: style simple, short, thicker at the base: stigmas three, reflex: there is no pericarpium: the seed is a nut (acorn) ovate-cylindrical, coriaceous, smooth, filed at the base, one-celled, fixed in a short hemispherical cup tubercled on the outside.

The species cultivated are:—1. *Q. Robur*, Common Oak Tree; 2. *Q. Phellos*, Willow-leaved Oak Tree; 3. *Q. Prinus*, Chestnut-leaved Oak Tree; 4. *Q. nigra*, Black Oak Tree; 5. *Q. rubra*, Red Oak Tree; 6. *Q. alba*, White Oak Tree; 7. *Q. esculus*, Italian or Small Prickly-cupped Oak Tree; 8. *Q. Aegilops*, Great Prickly-cupped Oak Tree; 9. *Q. Cerris*, Turkey Oak Tree; 10. *Q. Ilex*, Evergreen or Holm Oak Tree; 11. *Q. Gramuntia*, Holly-leaved Evergreen Oak Tree; 12. *Q. Suber*, Cork-barked Oak, or Cork Tree; 13. *Q. coccifera*, Kermes Oak Tree.

The first is well known, and attains a very great size, but slowly. In woods it rises to a very considerable height, but singly it is rather a spreading tree, sending off horizontally immense branches, which divide and subdivide very much. The trunk is covered with a very rugged brown bark. The leaves alternate, oblong, blunt, and broader towards the end; the edges deeply sinuate, forming obtuse or rounded lobes, dark green and shining above, paler underneath and finely netted, five inches or more in length, two and a half in breadth: they are deciduous, but often remain on the tree till the new buds are ready to burst. A native of Europe.

There are several varieties; as with the acorns on long peduncles. This is found in the wilds

of Kent and Sussex, where there are many large trees. The leaves are not so deeply sinuated, nor are they so irregular, but the indentures are opposite; they have scarce any footstalks, but sit close to the branches: but the acorns stand upon very long footstalks. The timber of this sort is accounted better than that of the common oak, and the trees have a better appearance.

The Broad-leaved Evergreen Oak, which grows upon the Apennines, and also in Suabia and Portugal. The leaves are broader and not so deeply sinuated as those of the common oak; they are of a lighter green on their upper side, and pale on their under, have very short footstalks, and their points are obtuse; the acorns have very long footstalks, which frequently sustain three or four in a cluster.

The Dwarf Oak, which grows in the South of France and Italy, and is a low bushy oak, rises but six or seven feet high, sending out many slender branches the whole length. The leaves are oblong and obtusely indented, about three inches long, and an inch and half broad, standing upon slender footstalks; the acorns small, growing in clusters.

There are also many other varieties of common oak which dealers in timber and woodmen distinguish by their use, qualities, and accidents, and to which they give different names; but these being merely local, and not founded on permanent characters, it is difficult to ascertain them.

The second species grows naturally in North America, flowering in May and June. There they distinguish two sorts, one of which is called The Highland Willow Oak, and grows upon poor dry land; the leaves are of a pale green and entire, shaped like those of the willow tree. The acorns are very small, but have pretty large cups.

The other grows in low moist land, and rises to a much greater height: the leaves are larger and narrower, but the acorns are of the same size and shape. It is suggested, as probable, that their difference may be owing to the soil in which they grow. Martyn observes, that the latter becomes a large timber tree, and that there are said to be several varieties of it.

The third species has seemingly two varieties, one of which grows to a much larger tree than the other; but this may be occasioned by the soil, for the largest trees grow in rich low lands, where they become bigger than any of the North American Oaks. The wood is not of a very fine grain, but is very serviceable; the bark is gray and scaly; the leaves are five or six inches long, and two inches and a half broad in the middle, indented on the edges with many transverse veins running from the midrib to the

borders; they are of a bright green, and so nearly resemble those of the chestnut-tree as scarcely to be distinguished from it. The acorns are very large, and their cups are short. The leaves of the other variety are not so large, nor so strongly veined, and the acorns are smaller and a little longer. The different varieties are distinguished by the form of the leaves, which in the one is ovate and in the other oblong. It flowers here in May and June.

The fourth species grows on poor land in most parts of North America, where it never attains to a large size, and the wood is of little value. The bark is of a dark brown colour. The leaves are very broad at the top, where they have two waved indentures, which divide them almost into three lobes; they diminish gradually to their base, where they are narrow; they are smooth, of a lucid green, and have short footstalks. The acorns are smaller than those of the common oak, and have short cups.

The fifth arrives at a large size in North America, where it grows naturally. The bark is smooth, of a grayish colour, but that of the younger branches is darker. The leaves six inches long, two inches and a half broad in the middle, obtusely sinuate, each sinus ending in a bristly point, bright green, standing upon short footstalks: the leaves continue their verdure very late in autumn; so that unless hard frost comes on early, they do not fall till near Christmas, and do not even change their colour much sooner. The acorns are a little longer than those of the common oak, but not so thick. There are several varieties.

The sixth species is esteemed preferable in America to any of their other sorts for building, being much the most durable. The bark is grayish; the leaves are light green, six or seven inches long, and four broad; they are regularly cut almost to the midrib, and stand on short footstalks. The acorns greatly resemble those of the common Oak.

The seventh has the leaves smooth and deeply sinuated; some of the sinuses are obtuse, and others end in acute points; they are on very short footstalks: the branches are covered with a purplish bark when young: the acorns are long and slender; the cups rough and a little prickly, sitting close to the branches. These acorns are sweet, and frequently eaten by the poor in the South of France: in times of scarcity they grind them and make bread with the flour. It is a native of the South of Europe, flowering in May.

The eighth species is one of the fairest species of oak. The trunk rises as high as that of the common oak; the branches extend very wide on every side, and are covered with a grayish bark,

intermixed with brown spots. The leaves are about three inches long, and almost two inches broad, deeply cut with most of the teeth turning back, and terminating in acute points; they are stiff, of a pale green on their upper side, and downy on their under. The acorns have very large scaly cups, which almost cover them; the scales are woody and pointed, standing out a quarter of an inch; some of the cups are as large as middling apples. A native of the Levant, whence the acorns are annually brought to Europe for dyeing.

The ninth has the leaves oblong and pointed, and frequently lyrate; they are jagged and acute-pointed, a little hoary on their underside, and stand on slender footstalks. The acorns are small, and have rough prickly cups. It is a native of the South of Europe.

There are several varieties.

The tenth species has several varieties, differing greatly in the size and shape of their leaves; but these will all arise from acorns of the same tree; even the lower and upper branches have very frequently leaves very different in size and shape, those on the lower branches being much broader, rounder, and their edges indented and set with prickles; but those on the upper long, narrow, and entire. The leaves are from three to four inches long, and an inch broad near the base, gradually lessening to a point; they are of a lucid green on their upper side, but whitish and downy on their under, stand upon pretty long footstalks, and do not fall till they are thrust off by young leaves in the spring. The acorns are smaller than those of the common oak, but of the same shape. It is a native of the South of Europe, Cochinchina, and Barbary.

The eleventh is hardly a distinct species from the common Evergreen Oak. It is a native of the South of France, and flowers in June.

The twelfth species has two or three varieties; one with a broad leaf, a second with a narrow leaf, both evergreen; and one or two which cast their leaves in autumn; but the broad-leaved evergreen is the most common. The leaves of this are entire, about two inches long, and an inch and quarter broad, with a little down on their under sides, on very short footstalks: these leaves continue green through the winter till the middle of May, when they generally fall off just before the new leaves come out; so that the trees are often almost bare for a short time. The acorns are very like those of the common oak. It is a native of the South of Europe, Barbary, &c.

The exterior bark forms the cork, which is taken from the tree every eight or ten years; but there is an interior bark which nourishes them, so that stripping off the outer bark is so far from

injuring the trees, that it is necessary to continue them; for, when the bark is not taken off, they seldom last longer than fifty or sixty years in health; whereas trees which are barked every eight or ten years will live 150 years or more. The bark of a young tree is porous and good for little: however, it is necessary to take it off when the trees are twelve or fifteen years old, for without this the bark will never be good: after eight or ten years, the bark will be fit to take off again; but this second peeling is of little use: at the third peeling the bark will be in perfection, and will continue so for 150 years, as the best cork is taken from old trees. The time for stripping the bark is in July, when the second sap flows plentifully: the operation is performed with an instrument like that which is used for disbarking the oak.

The thirteenth is of small growth, seldom rising above twelve or fourteen feet high, sending out branches the whole length on every side, so as to form a bushy shrub: the leaves are armed with prickles like those of the holly; the acorns are smaller than those of the common oak. The leaves resemble those of the *Ilex*, but are less, thinner, and green on both sides. It is a native of the South of Europe, the Levant, Barbary, &c., flowering in May.

From this species they collect the Kermes or scarlet grain, a little red gall, occasioned by the puncture of an insect called *Coccus ilicis*. With this the ancients used to dye cloth of a beautiful colour.

Culture.—These trees are all capable of being raised from the seed or acorns, which, in the common oak, should be gathered in autumn when quite ripe, just as they drop from the trees; but those of most of the foreign oaks are generally procured from abroad, and sold by the seedsmen.

All the sorts should be sown as soon after they are obtained as possible, as they are apt to sprout if they remain long out of the ground; and for their reception a spot of light ground in the nursery should be prepared by digging or ploughing, dividing it into four-feet-wide beds, in which the acorns should be sown, either in drills, two inches deep, in five or six rows, lengthwise of the bed: or rake the mould off the bed, the depth of two inches, into the alleys; then sowing the acorns all over the surface, about two or three inches apart, press them down with the spade, and spread the earth evenly over them two inches thick.

When they come up in the spring they should have occasional waterings and weeding; and when the plants are one or two years old, it is proper to plant them out in nursery-rows; this may be done in autumn, winter, or early in the

spring, taking them carefully up out of the seed-bed, shortening their perpendicular tap-roots, and trimming off any lateral shoots from the stem, leaving their top perfectly entire; then planting them in lines two feet and a half asunder, and fifteen or eighteen inches in the rows, where they should stand, with the usual nursery care, till of a proper size for final planting out either as forest-trees, or for ornament, training them up as full standards, with clean straight stems, and with their tops still entire.

But in raising the striped-leaved varieties of the common oak, and any particular variety of the other species, it should be by grafting, (as they will not continue the same from seed,) which should be performed upon any kind of oakling stocks raised from the acorns, and trained for standards as in the other kinds.

With respect to the final planting out, it may be performed in all the sorts of deciduous oaks any time in open settled weather, from November till February or March, and in the evergreen kinds in October, November, or the spring; and in a mild open season in any of the winter months.

When the trees of all the sorts are from about three or four to six feet stature, they are proper for being planted out for good, though, as forest- or timber-trees, it is better to plant them out finally while they are quite young, as from two to three or four feet in height; or when planted immediately from the seed-bed, where they are to remain, it may be advantageous, as the very young oaks root more freely than older trees, and take a freer growth. Those designed as forest- or timber-trees, should be planted in large open tracts of ground to form woods, placing them in rows only four or five to ten feet asunder, and from two or three to five or six feet in the rows, to allow for a gradual thinning. See PLANTATION and PLANTING.

Sometimes large plantations of these trees, for woods, are raised by sowing the acorns at once in the places where they are to remain; it being generally found that the trees raised at once from the acorn, from their not being checked, much outstrip the transplanted trees in their growth. The method of performing it is this: the ground being prepared by good ploughing and harrowing, in the autumn, having procured a proper quantity of acorns, draw drills across the ground four feet asunder, and two inches deep, dropping the acorns into them six or eight inches asunder, allowing for falling and thinning, covering them in evenly with the earth the depth of the drills; or instead of drilling them in, they may be planted with a dibble, the same depth and distance.

The general management of these trees in woods or timber plantations is the same as

Q U I

directed for forest-trees in general. See **PLANTATION**.

All the above sorts of trees may be employed to diversify large ornamental plantations in out-grounds, and in forming clumps in spacious lawns, parks, and other extensive open spaces: the evergreen kinds in particular have great merit for all ornamental purposes in pleasure-grounds and plantations. And all the larger growing kinds, both deciduous and evergreens, are highly valuable as forest-trees for timber; but the first sort claims precedence as a timber-tree, for its prodigious height and bulk, and superior worth of the wood.

In planting any of the species for ornament or variety in large pleasure-grounds, some may be disposed in assemblage in any continued plantation, some in clumps, and others singly.

QUICK, a term applied to signify any sort of young plant, but especially those of the white-thorn kind. By it is also often understood a live hedge, of whatever plants composed, in contradistinction to a dead hedge, but more properly the shrubs of which such live hedge is formed. In a strict sense it is however applied to the *Crataegus oxyacantha*, or Hawthorn, the young plants or sets of which are commonly sold by the nursery-gardeners under the name of Quick.

In the choice of these sets, those which are raised in the nursery are in general to be preferred to such as are drawn out of the woods, as the latter have seldom good roots: many persons, however, prefer them, as they are larger

Q U I

plants than are commonly to be had in the nursery. See **CRATÆGUS**.

QUINCUNX, in gardening, is a form of planting in which the trees are planted by fives, four of them forming a square, and the fifth placed in the middle,

thus * * and may be repeated over and

over in one continued plantation, with as many trees in several ranges as may be proper. It was formerly a fashionable mode of planting groves and other regular plantations. It is seen more fully below:

```

* * * * *
  * * * *
* * * * *
  * * * *
* * * * *
  
```

Something of this mode of arrangement has always a good effect in the disposition of shrubbery-plants, &c., though not in the regular order of it, but something nearly so, which gives the shrubs a greater scope of growth, and shows them to greater advantage. It is likewise a mode of planting that is proper in the kitchen-garden, in transplanting many kinds of esculent plants; such as lettuces, endive, strawberries, and even all the cabbage kinds, and many other plants, which gives them a greater scope to grow than if planted exactly square at the same distance from each other.

QUICKEN TREE. See **SORBUS**.

QUINCE TREE. See **PYRUS CYDONIA**.

R A C

RACER, a name applied to a sort of sward-cutter, or cutting implement used in racing out or cutting through the surface of grass sward, and dividing it into proper widths, lengths, and thickness, for turf intended to be cut up for laying in pleasure-grounds, and always necessary preparatory to the work of flaying or cutting up the turf with the turving-iron. It is also useful for cutting and straightening the edges of grass verges in such grounds.

It is a simple tool, consisting of a strong wooden handle about four feet long, having the cutter fixed at the lower end in the form of a half moon with the edge downward, to cut into the sward; the handle should be about an inch

R A C

and half thick, growing gradually thicker towards the lower end. See **PLATE ON IMPLEMENTS**.

In using it is pushed forward so as to cut or race out the sward in an expeditious manner.

In cutting turfs with it, it is necessary first to mark out on the sward the width of the turf intended, which should generally be a foot wide and a yard long, and about an inch or inch and a half deep; then strain a line tight, first lengthways, striking the racer into the sward close to the line, running it along expeditiously so as to cut its way, and divide the sward to a proper depth, afterwards placing the line a foot further, and racing it out as before, and so on to as many

widths as may be wanted; and then with the line placed crossways, to race out the sward accordingly in yard lengths. The sward being thus raced out, the turf-cutter with the turfing-iron should proceed to cut them up, and flay them off. See TURF.

RADISH. See **RAPHANUS**.

RADISH, HORSE. See **COCHLEARIA**.

RAGGED ROBIN. See **LYCHNIS**.

RAGWORT. See **SENECIO**.

RAKE, GARDEN, a well known sort of tool for raking the ground, as well as for putting in seeds, &c. with. In order to suit every kind of gardening work with rakes, there should be three or four different sizes, from about six to eighteen inches long in the head, having handles from six to eight feet in length, and the heads toothed with iron teeth two or three inches long, being placed from one to two inches asunder, according to the respective sizes.

The first or largest rake should have the head about fifteen to eighteen inches long, the teeth three inches, and placed two inches asunder, which is proper for raking stubborn or rough dug ground, and for putting in large kinds of seeds, raking off large weeds after hoeing, and many other purposes in large gardens.

The next size should have the head twelve inches long, the teeth three inches, being placed one inch and half asunder, which is proper for all common raking in ordinary light ground, and for raking in most kinds of small seeds, as well as other purposes.

A third sort of small rake should have the head about nine inches long, the teeth two and a half, being placed one inch asunder; proper for fine-raking beds, borders, &c., and raking in some particular fine seeds; as well as between rows, &c., of certain plants occasionally, where larger rakes cannot be introduced.

The smallest sort should have the head six inches long, the teeth two and a half, and placed one inch asunder; being very useful for raking between small plants in beds and borders and other small parts, where the plants stand close, as well as several other purposes of that kind.

These sorts of rakes are constructed both with wooden heads and iron teeth, and with the heads wholly of iron in both; of which the teeth are generally flattened, the back edge rounded off and narrowing gradually to the point, the other straight, and placed on the heads edge-ways across, with the back edge outward, and with the points all inclining very moderately inward, in a regular manner: the wooden-headed rakes having each end of the head hooped with a thin flat iron ring, to secure it from splitting.

The first sort are generally lightest and cheap-

est, being proper for any kind of garden raking; but the latter, or iron-headed rakes, when made neat, and as light as possible, with the teeth well set, in a proper position, and firmly fastened, are equally proper, and in some cases preferable, such as in wetish or moist soils, as not being liable to clog so much as wooden rakes, and more durable. They are, however, more proper for middling and small rakes, than for large ones; as, in strong raking, the teeth are more liable to get loose, than in the wooden-headed rakes.

Both the sorts, in their different sizes, are sold at the principal ironmongers' shops, both with and without handles.

Rakes having the heads, teeth, and handles, wholly of wood, are sometimes used for particular purposes; such as raking in light kinds of kitchen-garden seeds in light ground, and taking off large hoed-up weeds in wide clear spaces, raking up swaths of mowed short grass before the sweepers, also fallen leaves of trees in autumn, and clippings of hedges, &c., as well as several other uses.

RAKING, a necessary operation in gardening, to break the surface of the soil small, and render it fine for the reception of particular sorts of small seeds and plants previous to sowing and planting, as well as to render it neat and even.

It is also employed in raking in seeds, as being an expeditious mode of covering them in. In all kinds of small seeds of hardy plants, the ground being dug, &c., and the surface remaining rough after the spade, the seed is sown, and then raked in with an even hand, once or twice in a place, as a back and a fore stroke.

This operation is useful also among growing plants that stand distant enough to admit the rake, particularly where the surface is inclinable to bind; or where numerous small seed-weeds appear, as it loosens the soil, and retards the growth of the weeds, and promotes the growth of the young plants: it is also good culture at particular seasons, to annoy slugs, especially in kitchen gardens, to rake between the rows of small plants in autumn and winter, &c.

And raking the beds, borders, and other compartments of pleasure-grounds, now and then, smooth and even, gives an air of culture and neatness.

This sort of work should generally be performed in dry weather and when the ground is also moderately dry, as when done in rainy weather, or when the ground is very moist and cloggy, the surface is apt to cake and bind hard; this should be well attended to in sowing seeds. Rough dug ground does not rake well when it is

become very dry at top, especially if it was dug wet, and suffered to lie till the clods have become very dry and hard, in which case it will not rake well until mellowed or pulverised by a shower of rain. But common light garden ground generally rakes best when fresh dug, perhaps the same day, or day after at the furthest, before dried too much by the sun and wind, or rendered wet by rain, &c. The operation should, however, be performed when the ground is in such order as the clods will readily break and fall to pieces under the rake without clogging much thereto.

RAMPIONS. See **CAMPANULA**.

RAMSONS. See **ALLIUM**.

RANDIA. See **GARDENIA**.

RANUNCULUS, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Polyandria Polyginia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a five-leaved perianth: leaflets ovate, concave, coloured a little, deciduous: the corolla has five petals, blunt, shining, with small claws: the nectary a little cavity just above the claw, in each petal: the stamina have very many filaments, shorter by half than the corolla: anthers upright, oblong, blunt, twin: the pistillum has numerous germs, collected into a head: styles none: stigmas reflex, very small: there is no pericarpium: the receptacle connecting the seeds by very minute peduncles: the seeds very many, irregular, varying in figure, naked, with a reflex point.

The species cultivated are: 1. *R. Asiaticus*, Persian Crowfoot, or Garden Ranunculus; 2. *R. aconitifolius*, Aconite-leaved Crowfoot; 3. *R. acris*, Upright Meadow Crowfoot; 4. *R. repens*, Creeping Crowfoot; 5. *R. amplexicaulis*, Embracing-leaved Crowfoot.

There are other species that may be cultivated for variety.

The first has an upright branched stem, pubescent, round, as are also the peduncles: the lower leaves simple, lobed, gashed, acute, pubescent underneath, as are also the petioles: the root is composed of many thick fleshy fangs or fibres, uniting at top into a head; from these are sent forth many slender long fibres, striking deep in the ground: from the top arise several leaves, composed of three, six, or nine lobes of irregular forms, and cut at top into various segments; between these arise the flower-stalks, about a foot high, taper, hairy, and branching out at a little distance from the root: stem-leaves dividing into three parts, these again cut, and generally terminated by trifid points: the petioles are embracing at the base: the leaves

VOL. II.

are all hairy; the lower ones much larger and more compound than the upper: the flowers are terminating, with the stem naked for a considerable length below them. They vary much in size and colour, and the petals are frequently of different colours on the two surfaces. They appear in May; and in moderate seasons; or where they are shaded from the sun in the heat of the day, there will be a succession at least during a month: the seeds ripen in July. It is a native of the Levant.

The varieties are exceedingly numerous, being sometimes divided into two classes, as the Old Turkey kinds and the Persian kinds, the varieties of the latter amounting to many hundreds, and being considerably more various, rich, and beautiful in colour, than the others.

In the former of these they rise with a strong generally unbranching stalk a foot high, terminated by one large double flower, sometimes emitting one or two smaller ones from its sides, and of which there are red-flowered, scarlet-flowered, yellow-flowered, and scarlet turban-flowered, &c., being seldom tinged with different colours, as in the Persian kinds.

The latter rise eight or nine inches high, generally branching from the bottom, producing from five or ten to twenty or more flowers on each root, and of which there are single-flowered, semi-double-flowered, full-double-flowered, large and full like a double rose, being generally filled with petals to the very centre, forming a regular globular body, of admirable elegance, of all sorts of the most beautiful colours in different varieties, and of numerous degrees of deeper and lighter shades, stripes, and tinges in the several colours.

Martyn observes, that "the varieties produced of late years from the seeds of semi-double flowers are unbounded; and that Mr. Maddock remarks that they are more numerous than of any other flower. Accordingly his catalogue, he says, boasts nearly eight hundred, all with their proper names; ranged under the heads of—Dark and Dark Purple; Light Purple and Gray, &c.; Crimson, &c.; Reds, &c.; Rosy, &c.; Orange, &c.; Yellow and Yellow-Spotted, &c.; White and White-Spotted, &c.; Olive, &c.; Purple and Coffee-Striped, &c.; Red and Yellow-Striped; Red and White-Striped."

According to Mr. Maddock, "a fine Ranunculus should have a strong straight stem, from eight to twelve inches high. The flower should be of a hemispherical form, at least two inches in diameter, consisting of numerous petals gradually diminishing in size to the centre, lying over each other, so as neither to be too close nor too much separated, but having more of a per-

pendicular than horizontal direction, in order to display the colours with better effect. The petals should be broad, with entire well-rounded edges; their colours dark, clear, rich or brilliant, either of one colour or variously diversified, on an ash, white, sulphur or fire-coloured ground, or else regularly striped, spotted or mottled, in an elegant manner."

The second species is very handsome, three or four feet high and branched: the stem hollow within: the leaves large, digitate, three-lobed, divided to the base: segments lanceolate, serrate all round, somewhat hirsute, especially at the base: the flower white, terminating each branch. It is a native of the Alps of Europe.

There is a variety with double flowers, which has been obtained by seeds, and is preserved in many curious gardens for the beauty of its flowers. It is by some gardeners called *Fair Maid of France*. The root is perennial, and composed of many strong fibres: the leaves are divided into five lanceolate lobes: the four side-lobes are upon footstalks coming from the side of the principal stalk, and the middle one terminates it; they are deeply serrate, and have several longitudinal veins. The stalks rise a foot and a half high, and branch out at the top into three or four divisions, at each of which there is one leaf, of the same shape with the lower, but smaller. The flowers are pure white, and very double, each standing upon a short footstalk. It flowers in May.

The third has a perennial, tuberous root, with many long simple white fibres: the stem upright, about two feet high, round, hollow, having close-pressed hairs on it, not very leafy, much branched at top: the leaves are three-parted and five-parted, many-cleft; the segments black or deep purple at the points: the root-leaves on long upright petioles: the stem-leaves nearly sessile, less, and more finely cut: the uppermost linear and sessile: sheaths of the footstalks hairy. It flowers in June and July.

There is a variety with double flowers, which is the sort cultivated in the garden. It is frequent among other herbaceous perennials, under the name of *Yellow Bachelor's Buttons*.

The fourth species has a perennial root, consisting of numerous whitish fibres: the stems generally several from one root, a foot or more in length, beset with rough hairs, throwing out long creeping runners: the leaves are ternate, trifid and gashed, generally hairy on both sides, but sometimes smooth and shining, frequently marked with white (black) spots, on long hairy petioles dilated at the base: the leaflets also are on petioles, and are sometimes divided only into two segments: the leaves are broad, dark, and

distinctly divided twice: the uppermost are quite entire: the flowering-stems are erect, branched and leafy, generally supporting two flowers. It flowers in June.

There is a variety with double flowers, which is the sort cultivated in the gardens.

In the fifth the leaves in part surround the stalk at their base, whence the trivial name: in colour they differ from most others of the genus, being of a gray or more glaucous hue; which, joined to the delicate whiteness of the flowers, renders it very desirable in a collection of hardy herbaceous plants, more especially as it occupies little space, and has no tendency to injure the growth of others. It is a native of the Apennine and Pyrenean mountains, flowering in April and May.

Culture.—The first sort and the different varieties may be readily increased by the off-sets taken from the root, and new varieties may be raised from the seed.

In the first method the off-sets should be separated from the roots in dry weather, in the latter end of summer, when the flowering is over, and the stems and leaves are declining, being placed in bags or boxes, in a dry place, till the autumn, when they should be planted out in rows six or eight inches apart, and six of them in separate beds, prepared with light sandy earthy compost, to the depth of two or three feet, taking care to protect them carefully from the frost during the winter. When the buds begin to break through the ground they should be kept perfectly clear from weeds, protecting them from frosts; and when they have flowered and the stems are decayed, the root should be taken up, cleared from dirt, and placed in bags or boxes till the autumn, when they must be planted again.

In the second mode, the seed should be collected from the best plants, of the semi-double kinds, and be sown in flat pans or boxes, filled with light rich earth, in August, covering it in about a quarter of an inch thick with the same sort of earth, placing them in a shady situation, so as to have a little of the morning sun. The pots should remain here till the beginning of October, when the plants sometimes appear, though it is often later before this happens, when they should have a more open exposure with the full sun; but when frost is apprehended, they should be removed under a common hot-bed frame, being only covered in the nights and bad weather with the glasses, guarding them well against rains and frost.

In the spring following they should be exposed to the open air, being very slightly refreshed with water, having a situation to enjoy the

morning sun; and when their leaves and stems begin to decay, the roots may be taken up, dried in a proper place, and then put up in bags to be planted out in the same manner as the old roots in October.

In the following summer they will produce flowers; when such as are good should be marked, and the others removed from them. The plants intended to flower should not be suffered to run to seed, as roots which have produced seeds seldom furnish fine flowers afterwards. The disappointments experienced in purchasing these roots chiefly depend upon this circumstance.

The roots intended for the borders should be planted towards the spring in little clumps or patches, three, four, or five roots in each, putting them in either with a dibble or trowel about two inches deep and three or four asunder in each patch, and the patches from about three to five or ten feet distance, placing them in a varied manner in the borders.

In regard to their general culture after planting, such of the forward autumnal-planted roots of the choice sorts in beds as have shot above ground, should in winter, where convenient, have occasional shelter from hard frosts by mats supported on low hoop arches; or in very severe weather be covered close with dry long litter, removing all covering in open weather: and in the spring, when the flower buds begin first to advance, shelter them in frosty nights with supported mats, suffering them however to be open to the full air every day; but the latter plantings, that do not come up in winter or very early in spring whilst frosty nights prevail, will not require any protection, and all those distributed in patches about the borders must also take their chance in all weathers: those of the different seasons of planting will succeed one another in flowering from the beginning of April until the middle of June, though the May blow generally shows to the greatest perfection.

After the blow is past, and the leaves and stalks withered, the roots should be taken up and dried in the shade, then cleared from all offsets and adhering mould, putting them up in bags or boxes till next planting seasons, when they must be planted again as directed above.

In each season of planting, it is highly necessary, in the principal fine varieties, to put them either in entire new beds, or the old ones refreshed with some fresh rich earth or compost, working the old and new well together, in order to invigorate the growth of the plants.

The other species are capable of being easily raised by the roots, which should be slipped or parted in autumn when past flowering, or in the spring before they begin to shoot, and the slips

be either planted at once where they are to remain, or in nursery-rows for a season, then planted out finally. They succeed in any common soil and situation, and may be dispersed about the different flower-borders and clumps, where they constantly remain, only trimming them occasionally; and once in a year or two, or when they have increased into large bunches, taking them up in autumn or spring to divide them for further increase, replanting them again directly.

In saving seed for raising new varieties, it must be suffered to continue on the plant till it becomes brown and dry, then be cut off, and spread upon paper, in a dry room, exposed to the sun, and when quite dry be put into a bag, and hung in a dry place till it is wanted.

All these plants are highly ornamental; the first sort in beds and pots, and the other in the borders, clumps, and other parts of pleasure-grounds.

RAPE. See BRASSICA.

RAPHANUS, a genus containing plants of the herbaceous annual esculent kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ*.

The characters are: that the calyx is a four-leaved perianth, erect: leaflets oblong, parallel, converging, deciduous, gibbous at the base: the corolla four-petalled, cruciform: petals obcordate, spreading: claws a little longer than the calyx: nectariferous glands four; one on each side, one between the short stamen and pistil, and one on each side between the longer stamens and the calyx: the stamens have six, awl-shaped filaments, erect; of these, two that are opposite are of the same length with the calyx, and the remaining four are the length of the claws of the corolla: anthers simple: the pistillum is an oblong germ, ventricose, attenuated, the length of the stamens: style scarcely any: stigma capitate, entire: the pericarpium is an oblong silique, with a point, ventricose with little swellings, subarticulate, cylindrical: seeds roundish, smooth.

The species cultivated is: *R. sativus*, Common Garden Radish.

It has an annual root, large, fleshy, fusiform or subglobular, white within, red or white or black on the outside: the stem upright, thick, very much branched and diffused, rough with pellucid bristles: the leaves rough, lyrate: the calyx green, rough-haired: the petals pale violet, with large veins running over them: the pod long, with a sharp beak, fungous, white, with distant streaks, many-celled: cells membranaceous, closed, in a double longitudinal

row, along the middle septum: the seeds, one in each cell, but in each row from three to twelve, subglobular, large, ferruginous, covered with very minute raised dots. It is a native of China.

There are several varieties; some of which have the appearance of distinct species, from their shape, size, and colour of the roots; as the *Long-rooted*, which is that commonly cultivated in kitchen-gardens for its roots. Of this there are several subordinate variations: as the *Small-topped*, the *Deep Red*, the *Pale Red* or *Salmon*, and the *Long-topped Striped Radish*. The *small-topped* is most commonly preferred by the gardeners near London, as they require much less room than those with large tops; for as forward radishes are what produce the greatest profit to the gardener, and these are commonly sown upon borders near hedges, walls or pales, the large-topped sorts would be apt to grow mostly at top, and not swell so much in the root as the other, especially if the plants should be left pretty close.

The *Small Round-rooted*, which is not very common here, but in many parts of Italy it is the only one cultivated;—the roots of this are very white, round, small, and very sweet. It is now frequently brought to the London markets in the spring, generally in bunches, and is sometimes mistaken there for young turnips: when eaten young, it is crisp, mild, and pleasant.

The *Large Turnep-rooted* or *White Spanish*, which has a moderately large, spheroidal white root, and is esteemed chiefly for eating in autumn and the early part of winter. Both these sorts are commonly called indiscriminately Turnep Radishes.

The *Black Turnep-rooted Spanish*, which has a root like the preceding, white within, but with a black skin; and is greatly esteemed by many for autumn and winter eating.

Culture.—These are raised from seed by different sowings from the end of October till April or the following month. They should have a light fine mould, and the more early sowings be made on borders, under warm walls, or other similar places, and in frames covered by glasses.

The common spindle-rooted, short-topped sorts are mostly made use of in these early sowings, the seed being sown broadcast over the beds after they have been prepared by digging over and raking the surface even, being covered in with a slight raking. Some sow carrots with the early crops of radishes.

It is usual to protect the early sown crops in the borders, during frosty nights and bad weather, by mats or dry wheat straw, which should

be carefully removed every mild day. By this means they are brought more forward, as well as form better roots.

Where mats are used, and supported by pegs or hoops, they are readily applied and removed.

A second more general sowing should be made in January or February.

When the crops have got their rough leaf, they should be thinned out where they are too thick, to the distances of two inches, as there will be constantly more thinning by the daily drawing of the young radishes.

When the weather is dry in March, or the following month, the crops should be occasionally well watered, which not only forwards the growth of the crops, but increases the size of the roots, and renders them more mild and crisp in eating.

The sowings should be continued at the distance of a fortnight, till the latter end of March, when they should be performed every ten days, until the end of April or beginning of the following month. In sowing these later crops, it is the practice of some gardeners to sow coss-lettuces and spinach with them, in order to have the two crops coming forward at the same time, but the practice is not to be much recommended, where there is sufficient room.

In sowing the main general crops in the open quarters, the market-gardeners generally put them in on the same ground where they plant out their main crops of cauliflowers and cabbages, mixing spinach with the radish seed as above, sowing the seeds first, and raking them in, then planting the cauliflowers or cabbages; the radishes and spinach come in for use before the other plants begin to spread much, and as soon as those small crops are all cleared off for use, hoe the ground all over to kill weeds and loosen the soil, drawing earth about the stems of the cauliflowers and cabbages.

The Turnep Radish should not be sown till the beginning of March, the plants being allowed a greater distance than for the common spindle-rooted sort. The seeds of this sort are apt to degenerate, unless they are set at a distance from that kind.

The White and Black Spanish Radishes are usually sown about the middle of July, or a little earlier, and are fit for the table by the end of August, or the beginning of September, continuing good till frost spoils them. These should be thinned to a greater distance than the common sort, as their roots grow as large as turnips, and should not be left nearer than six inches.

To have these roots in winter, they should be drawn before hard frost comes on, and laid

in dry sand, as practised for carrots, carefully guarding them from wet and frost; as in this way they may be kept till the spring.

In regard to the culture of the general crops, they require very little, except occasional thinning where they are too thick, when the plants are come into the rough leaf, either by hoeing or drawing them out by hand; though for large quantities, small-hoeing is the most expeditious mode of thinning, as well as most beneficial to the crop by loosening the ground; in either method thinning the plants to about two or three inches distance, clearing out the weakest, and leaving the strongest to form the crop.

In order to save the seed, about the beginning of May some ground should be prepared by digging and levelling; then drawing some of the straightest and best-coloured radishes, and plant them in rows three feet distant, and two feet asunder in the rows; observing, if the season be dry, to water them until they have taken root: after which they will only require to have the weeds hoed down between them, until they are advanced so high as to overspread the ground.

When the seed begins to ripen, it should be carefully guarded against the birds. When it is ripe, the pods will change brown: then it must be cut, and spread in the sun to dry; after which it must be thrashed, and laid up for use where no mice can come at it.

Culture on Hot beds.—This method is sometimes practised in order to have the roots early, as in January or the following month. They should have eighteen inches depth of dung to bring them up, and six or seven inches depth of light rich mould. The seed should be sown moderately thick, covering it in half an inch thick, and putting on the lights: the plants usually come up in a week or less; and when they appear, the lights should be lifted or taken off occasionally, according to the weather; and in a fortnight thin the plants to the distance of an inch and half or two inches, when in six weeks they will be fit to draw. Where there are no frames to spare, the beds may be covered with mats over hoops, and the sides secured by boards and straw-bands. And when in want of dung, if the beds be covered with frames, and the lights put on at night and in bad weather, the plants may be raised for use a fortnight sooner than in the open borders.

RASPBERRY. See RUBUS.

RATTAN. See CALAMUS.

RATTLE, RED. See PEDICULARIS.

RATTLE, YELLOW. See RHINANTHUS.

RAUWOLFIA, a genus containing plants of the tender exotic shrubby kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortas*.

The characters are: that the calyx is a five-toothed perianth, very small, permanent: the corolla one-petalled, funnel-form: tube cylindrical, globular at the base: border five-parted, flat: segments roundish, emarginate: the stamina have five filaments, shorter than the tube: anthers erect, simple, acute: the pistillum is a roundish germ: style very short: stigma capitate: the pericarpium a subglobular drupe, one-celled, with a groove on one side: the seed two nuts, convex at the base, attenuated at the top, compressed, two-celled.

The species are: 1. *R. nitida*, Shining Rauwolfia; 2. *R. canescens*, Hoary Rauwolfia.

The first is a small tree, shining all over very much, upright, full of a white glutinous milk, twelve feet high: the leaves at the joints of the twigs in fours, lanceolate, quite entire, sharp, petioled; the two nearest five inches in length, twice as long as the two others. Common peduncles racemed, terminating, half an inch long, two or three together: the flowers small, without scent, having white petals. The fruits are at first yellowish, but at length become very dark purple, are milky, and three times as large as a pea: globular, fleshy, twin, two-seeded: the nuts or stones, like those of grapes, of a bony substance. It is a native of South America, flowering here from June to September.

The second species is an upright shrub, the whole of it milky, from one to eight feet in height, with all the parts of a corresponding size, according to the soil and situation. The younger branches subtomentose: the leaves in fours, obovate, attenuated to the base, acute, wrinkled, tomentose underneath, quite entire, the two nearest longer than the other two. Petioles hirsute, round. Common peduncles branched, terminating in fours. (Cymes peduncled, several, and two at the forkings of the stem.) Flowers reddish, small, without scent. It is a native of the Caribbee Islands, &c.

Culture.—These may be increased by the seeds or berries, which should be sown in pots filled with light mould, in the autumn or spring, plunging them in a mild hot-bed. When the plants have attained some growth, they should be removed into separate pots, and have the management of other exotic stove plants.

They may likewise be raised by layers and cuttings, laid down or planted out in pots, plunged in the hot-bed in the spring and summer months, till they have stricken root, being afterwards managed as those from seed.

They afford much ornament and variety in

hot-house collections, both in their foliage and flowers.

REED HEDGE, that sort of hedge or fence which is formed from reeds. They are a sort of temporary internal fences made with these dried materials which may be had cheap, and be expeditiously formed into hedges by the assistance of posts and railing, being of great utility for occasional use in gardens, to inclose particular internal spaces of ground, so as to afford shelter to certain seedling plants, both in nurseries and large kitchen-gardens; and in some nurseries, to form places of shelter for many sorts of seedling trees and shrubs, &c. which being tender whilst young, require the shelter of a fence in winter to break off severe or cutting blasts two or three years, till they gradually gather strength and a greater degree of hardiness. They are also useful in training several sorts of wall-fruit-trees against, to form them for rows, or what are called Trained Trees; admitting of planting trees against each side of them, six, eight, or ten feet asunder. See **NURSEY**.

In large open kitchen-gardens they are occasionally made use of to inclose the melonary, or place for raising early melons and cucumbers in, and often as cross internal fences, under which to form warm borders for the purpose of raising various early crops of esculents.

The proper sort of reeds for these fences are the dried stems of the common marsh reed, which grows in great plenty by river sides, and in lakes, and marshy places, furnishing a crop of stems annually fit to cut in autumn, when they should be bound in bundles, and stacked up, or housed to remain for use.

These fences are sometimes erected in fixed ranges, and sometimes formed into moveable pannels. In the first mode, some stout posts should be placed six or eight feet asunder, and five or six high, and from post to post carry two or three ranges of flat thin railing, one range near the bottom, another near the top, and a third in the middle; against this railing, the reeds must be placed about two inches thick, having other railing fixed directly opposite, so that the reeds being all along between the double railing, the bottoms resting either upon a plate of wood, or let into the ground, but the former is preferable; and as soon as one pannel is formed, the railing should be nailed as close as possible, driving some long spike-nails through each double railing, or binding them with strong withy bands, or tar rope-yarn, but nailing is the best, in order to bring them as close as may be, to secure the reeds firmly in the proper position; the top should be cut even afterwards.

In the better method, a frame-work of railing

should be prepared as above, each pannel six or eight feet long, and the reeds fixed therein as before directed; then, where they are intended to be placed, posts must be ranged six or eight feet distant to support the different pannels. Or sometimes the pannels may be placed inclining against the wall or other fence, in time of severe weather, when the borders are narrow. These sorts of fences are now in much less use in gardening than formerly.

RESEDA, a genus containing a plant of the flowering sweet-scented kind. It belongs to the class and order *Dodecandria Trigynia*, and ranks in the natural order of *Miscellanea*.

The characters are: that the calyx is a one-leaved perianth, parted: parts narrow, acute, erect, permanent; two of which gape more, for the use of the melliferous petal. The corolla consists of some petals (3. 5. 6.), unequal, some of them always half-three-cleft; the uppermost gibbous at the base, melliferous, the length of the calyx.

Nectary a flat upright gland, produced from the receptacle, placed on the upper side between the stamens and the uppermost petal, converging with the base of the petals. The stamens have eleven or fifteen short filaments. Anthers erect, obtuse, the length of the corolla. The pistillum is a gibbous germ, ending in some very short styles. Stigmas simple. The pericarpium is a gibbous capsule, angular, acuminate by means of the styles, gaping between them, one-celled: the seeds very many, kidney-form, fastened to the angles of the capsule.

The species cultivated is: *R. odorata*, Sweet Reseda, or Mignonette.

It has the root composed of many strong fibres, which run deep in the ground. The stems are several, about a foot long, dividing into many small branches. The leaves are oblong, about two inches in length, and three quarters of an inch broad in the middle, of a deep green colour. The flowers are produced in loose spikes at the ends of the branches, on pretty long stalks, and have large calices; the corollas are of an herbaceous white colour, and a fine smell. It is supposed a native of Egypt, flowering from June to winter. It is biennial.

Mr. Curtis observes, that "the luxury of the pleasure-garden is greatly heightened by the delightful odour which this plant diffuses; and as it grows more readily in pots, its fragrance may be conveyed into the house: its perfume, though not so refreshing perhaps as that of the sweet-briar, is not apt to offend the most delicate olfactories."

Culture.—This is raised from seed, which should be sown on a moderate hot-bed in March,

and when the plants are strong enough to transplant, be pricked out upon another moderate hot-bed to bring them forward, having a large share of air in warm weather to prevent their drawing up weak. Or they may be sown in pots of light mould and plunged in the hot-bed, which is probably the better practice. In the first mode, about the end of May the plants may be planted out, some into pots, to place in or near the apartments, and others into warm borders, where they may remain to flower and seed. The plants which grow in the full ground often produce more seeds than those which are in pots; but at the time when the seed-vessels begin to swell, the plants are frequently apt to be infested with green caterpillars, which, if they are not destroyed, eat off all the seed-vessels.

When the seeds are sown on a bed of light earth in April, the plants come up very well; and when not transplanted, grow larger than those which are raised in the hot-bed; but they do not flower so early, and in cold seasons scarcely ripen their seeds. In a warm dry border, however, the seeds often come up spontaneously, and grow very luxuriantly: but to have the flowers early in spring, the seeds should be sown in pots in autumn, being kept in frames through the winter, or on a gentle hot-bed in spring. The plants may also be preserved through the winter in a green-house, where they continue flowering most part of the year, but the second year they are not so vigorous as in the first.

It is cultivated for the fine fragrant smell which it affords.

REST HARROW. See *ONONIS*.

RHAMNUS, a genus furnishing plants of the tree and shrub kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosa*.

The characters are: that there is no calyx, unless the corolla be taken for it: the corolla is an imperforate petal, externally rude, internally coloured, funnel-form: tube turbinate-cylindrical: border spreading, divided, acute: scalelets five, very small, each at the base of each division of the border, converging: the stamens have as many filaments as there are segments of the corolla, awl-shaped, inserted into the petal under the scalelet. Anthers small: the pistillum is a roundish germ. Style filiform, the length of the stamens. Stigma blunt, divided into fewer segments than the corolla: the pericarpium is a roundish berry, naked, divided into fewer parts internally than the corolla: the seeds solitary, roundish, gibbous on one side, flattened on the other.

The species cultivated are: 1. *R. catharticus*,

Purging Buckthorn; 2. *R. colubrinus*, Pubescent Rhamnus, or Buckthorn—Redwood; 3. *R. frangula*, Alder Buckthorn, or Berry-bearing Alder; 4. *R. paliurus*, Common Christ's-thorn; 5. *R. alaternus*, Common Alaternus; 6. *R. jujuba*, Blunt-leaved Buckthorn; 7. *R. oenophia*, Pointed-leaved Buckthorn; 8. *R. zizyphus*, Shining-leaved Buckthorn, or Common Jujube; 9. *R. Spina Christi*, Syrian Christ's-thorn.

The first rises with a strong woody stem to the height of twelve or fourteen feet, sending out many irregular branches: the young shoots have a smooth grayish-brown bark; but the older branches a darker and rougher bark, and are armed with a few short thorns. The leaves are two inches and a half long, by one and a quarter broad, dark green above but pale or light green beneath, having a pretty strong midrib, and several nerves proceeding from it, which diverge towards the sides, but meet again near the point: they stand upon pretty long slender footstalks. The flowers come out in clusters from the side of the branches: those of the male have as many stamens as there are divisions in the petal; those of the female (or hermaphrodite), have a roundish germ, which afterwards becomes a pulpy berry of a roundish form, inclosing four hard seeds. It is a native of Europe, flowering from the end of April to June, and ripening its berries about the end of September.

It is found that the juice of the unripe berries has the colour of saffron, and is used for staining maps or paper, being sold under the name of French berries: the juice of the ripe berries mixed with alum, is the sap-green of the painters; but if the berries be gathered late in the autumn, the juice is purple. The bark affords a beautiful yellow dye.

The second species is an upright tree, with most of the branches spreading out horizontally. The twigs, petioles, peduncles, lower surface of the leaves, and outer surface of the calyx, are covered with a slight ferruginous nap. The leaves are oblong-ovate, acute, entire, the upper surface smooth and shining, alternate, for the most part distich. The racemes short, corymbed, axillary, seven-flowered or thereabouts. The flowers are without scent, all pointing upwards, with greenish scales. It is a native of several islands in the West Indies, where it flowers in January, June, and November, but here in June.

The third rises with a woody stem to the height of ten or twelve feet, sending out many irregular branches, covered with a dark bark. The leaves are ovate-lanceolate, about two inches long and an inch broad, having several

transverse nerves from the midrib to the sides. the flowers are produced in clusters at the end of the former year's shoots, and also upon the first and second joints of the same year's shoot, each upon a short separate pedicel; they are small, of an herbaceous colour, and are succeeded by small round berries, which turn red, but are black when ripe. The flowers appear in June, and the berries ripen in September.

It is a native of most parts of Europe, flowering early in May, and sometimes in April.

The berries gathered before they are ripe, dye wool green and yellow—when ripe, blue-gray, blue, and green. The bark dyes yellow, and with preparations of iron, black.

There are two varieties, the broad-leaved, which has larger and rougher leaves—it grows naturally on the Alps; and the dwarf or round-leaved, which is of humble growth, seldom rising above two feet high—it grows on the Pyrenees.

The fourth species is a tree which rises with a pliant shrubby stalk to the height of eight or ten feet, sending out many weak slender branches, garnished with oval leaves placed alternately, standing upon footstalks nearly one inch long; these have three longitudinal veins, and are of a pale green. The flowers come out at the wings of the stalk in clusters, almost the length of the young branches; they are of a greenish-yellow colour, and appear in June, and are succeeded by broad, roundish, buckler-shaped seed-vessels, which have borders like the brims of a hat, the footstalks being fastened to the middle; these have three cells, each containing one seed. It is a native of the South of Europe, &c.

The fifth is a shrub with alternate, shining evergreen leaves, ovate, ovate-lanceolate, or lanceolate, often glandular at the base, having remote serratures about the edge. The flowers small, numerous, axillary, in short blunt racemes. There is a very small bracte at the base of each pedicel. The flowers are male and female or imperfect hermaphrodites, on the same or different individuals.

It is a native of the South of Europe and of Barbary. The fresh branches or young shoots, with the leaves, will dye wool a fine yellow. It flowers in April.

There are varieties with variegated leaves, commonly called Bloated Phillyrea by the nurserymen: and with the leaves striped with white and with yellow, called Silver and Gold-striped Alaternus.

The latter has the leaves much longer and narrower, and the serratures on the edges much deeper: this shoots its branches more erect,

forms a handsomer bush, and is equally hardy.

It is observed, that the Phillyrea is sometimes, and according to some, there are also the large-growing, the small-growing, the broad-leaved, the narrow-jagged-leaved, the yellow-striped jagged-leaved, the white-striped jagged-leaved—All which are confounded with the Alaternus, by such as are not botanists; but they may easily be distinguished by the position of their leaves, which are alternate in this, but placed opposite by pairs in that.

It is observed, that the Alaternus was much more in request formerly than at present; having been planted against walls in court-yards to cover them, as also to form evergreen hedges in gardens, for which purpose it is very improper, as the branches shoot very vigorously, and being pliant are frequently displaced by the wind; in winter, when much snow falls in still weather, the weight of it often breaks the branches; these hedges must also be clipped three times in a season to keep them in order, which is both expensive and occasions a great litter in a garden.

The sixth species is a tree with round branches. The leaves are very finely serrate, three-nerved, at the base on one side narrower, retuse, and there more deeply crenate, petioled. The flowers very many, axillary, each on very short pedicels, five-cleft, five-stamened; style bifid. Close to the petioles is a very small recurved prickly; but sometimes this is wanting. But according to Miller, it rises with shrubby stalks ten or twelve feet high, sending out many slender branches, which have a yellowish bark, and are armed with single recurved thorns (prickles) at each joint. The leaves are round, heart-shaped, about two inches in length and breadth, and indented at the footstalk; they have three nerves, and are covered with a yellowish down on their under side. The flowers come out in clusters from the wings of the branches, are small, of a yellowish colour, and succeeded by oval fruit about the size of small olives, inclosing a stone of the same shape. It is a native of the East Indies.

The seventh is a tree which has the leaves half-cordate or so on the upper side, but half-lanceolate on the hinder side, three-nerved, with the nerves branching, tomentose underneath, glaucous, on the wider side scarce manifestly serrate, petioled. In the axils on the opposite side are very many small clustered flowers, but on the same side with the petiole behind, is a recurved prickly. It is a native of the island of Ceylon.

In the eighth, according to Thunberg, the stem

is shrubby and branched; the branches and branchlets filiform and smooth; the prickles scattered, solitary or in pairs, commonly erect; the leaves alternate, on very short petioles, scarcely cordate, ovate and ovate-oblong, blunt with a very fine point, sometimes (but seldom) retuse, serrate, smooth, pale underneath, three-nerved, an inch long; the flowers axillary, two, three, or more together, very short and unequally peduncled; styles two, very short, with capitate stigmas. It is a native of the South of Europe, China, and Japan.

The fruit is sold in the market at Canton during the autumn. In Italy and Spain it is served up at the table in desserts during the winter season, as a dry sweetmeat.

The common or cultivated Jujube, according to Miller, has a woody stalk, dividing into many crooked irregular branches, armed with strong straight thorns, set by pairs at each joint: the leaves are two inches long and one broad, slightly serrate, on short footstalks: the flowers are produced on the side of the branches, two or three from the same place, sessile, small and yellow: the fruit oval, the size of a middling plum, sweetish and clammy, including a hard oblong stone, pointed at both ends.

The wild Jujube has slender woody stalks, which send out many weak branches, covered with a grayish bark, and armed with spines in pairs, one longer and straight, the other short and recurved: the leaves small, oval, veined, half an inch in length and breadth, and sessile. It is found about Tunis in Africa.

The ninth species sends up several shrubby stalks, dividing into slender branches, armed with straight spines, (prickles) set by pairs at each joint: the leaves are small, ovate, veined, alternate, upon very short footstalks: the flowers are small, yellow, axillary: the fruit round, about the size of the sloe. It is a native of Ethiopia.

Culture.—The first, third, and fourth sorts may be increased by seeds, layers, and sometimes by cuttings: the seeds should be sown in autumn as soon as ripe, on a bed of light earth, and slightly raked in: the plants mostly appear in the following spring, and when they have had a year or two's growth they should be planted out in nursery-rows, to have two or three years more growth, when they may be finally set out.

The layers should be made from the young shoots and be laid down in the autumn, in the usual way, giving a little twist or nick at the time, in the bark at a joint. They mostly become well rooted in twelve months.

Cuttings of the first and third sorts may be

made from the young twigs, and be planted in rows in the autumn, in a bed of good earth, when most of them will succeed.

The evergreen or Alaternus kinds may be raised from seeds and by layers. The plain sorts succeed in both methods, but the variegated sorts only with certainty by layers.

The seeds should be put into the ground in the early autumn in the same manner as above, and the layers laid down in the autumn as in the other kinds.

The other species may be raised by sowing the stones of the fruit in pots in the spring, plunging them in a moderate hot-bed. When the plants have attained some growth they should be removed into separate pots and managed as other tender plants.

They also succeed by suckers from the roots and layers as in the above sorts.

The sixth and eighth sorts may be placed in the green-house, and the others in the stove.

These are all ornamental plants; the hardy sorts for the pleasure-ground, and the more tender sorts for the green-house and stove, among other potted plants.

RHEUM, a genus containing plants of the herbaceous perennial luxuriant kind.

It belongs to the class and order *Enneandria Trigynia*, and ranks in the natural order of *Horaceæ*.

The characters of which are: that there is no calyx; or, which otherwise appears as the corolla, monopetalous, narrow at the base, and impervious, divided above into six parts, alternately smaller: the stamina have nine capillary filaments inserted into the corolla, and terminated by oblong didymous antheræ: the pistillum is a short triquetrous germen: the styles three, scarcely visible, and three reflexed plumose stigmas: there is no pericarpium, but one large, triquetrous, acute seed to each flower, having a membranous border.

The species chiefly cultivated are: 1. *R. Rhaponticum*, Rhapontic or Common Rhubarb: 2. *R. palmatum*, Palmated-leaved, or True Chinese Rhubarb: 3. *R. Compactum*, Compact Thick-leaved Rhubarb: 4. *R. undulatum*, Waved-leaved Chinese Rhubarb: 5. *R. ribes*, Wasted-leaved Persian Rhubarb: 6. *R. Tataricum*, Tartarian or Heart-leaved Rhubarb.

The first has a large, thick, fleshy, branching, deeply-striking root, yellowish within, crowned by very large, roundish-heart-shaped smooth leaves, on thick, slightly-furrowed footstalks; and an unusual upright strong stem, two or three feet high, adorned with leaves singly, and terminated by thick close spikes of white flowers. It is a native of Thrace and Scythia. This sort

is of inferior quality to some of the following; but the plant being astringent, its young stalks and footstalks of the leaves being cut and peeled in spring, are used for tarts and other culinary uses.

It is stated, on the authority of several cultivators of this plant, by the editor of Miller's Dictionary, that, by proper attention in the growth and preparation of the root, it may be obtained here nearly in equal goodness to the foreign.

The second species has a thick fleshy root, which is yellow within, crowned with very large palmated leaves, being deeply divided into acuminate segments, expanded like an open hand; the stems upright, five or six feet high or more, terminated by large spikes of flowers. This is said to be the true rhubarb.

The third has a large, fleshy, branched root, which is yellow within, and crowned by very large heart-shaped, somewhat lobated, sharply indented, thick smooth leaves; and an upright large stem, five or six feet high, garnished with leaves singly, and branching above; having all the branches terminated by nodding panicles of white flowers. It has been supposed to be the true rhubarb, which, however, though of superior quality to some sorts, is accounted inferior to the second sort.

The fourth species also has a thick, branchy, deep-striking root, which is yellow within, and crowned with large oblong, undulate, somewhat hairy leaves, having equal footstalks, and an upright firm stem, four feet high, garnished with leaves singly, and terminated by long loose spikes of white flowers.

The fifth has a thick fleshy root, and very broad leaves, full of granulated protuberances, and with equal footstalks; the stems upright, firm, three or four feet high, terminated by spikes of flowers, succeeded by berry-like seeds, being surrounded by a purple pulp. It is a plant of much singularity.

The sixth has a thick fleshy root, and heart-ovate, plane, smooth leaves; the petioles half cylindric-angled. It is a native of Tartary.

Culture.—These plants are all increased by seeds, which should be sown in autumn soon after they are ripe, where the plants are designed to remain, as their roots being large and fleshy when they are removed they do not recover it soon; nor do the roots of such removed plants ever grow so large and fair as those which remain where they were sown. When the plants appear in the spring, the ground should be well hoed over, to cut up the weeds; and where they are too close, some should be cut up, leaving them at the first hoeing six or eight inches asunder; but at the second, they may be separated to a foot and half distance or more. When

any weeds appear, the ground should be scuffled over with a Dutch hoe in dry weather; but after the plants cover the ground with their broad leaves, they keep down the weeds without any further trouble. The ground should be cleaned in autumn when the leaves decay, and in the spring, before the plants begin to put up their new leaves, be dug well between them. In the second year many of the strongest plants will produce flowers and seeds, and in the third year most of them. It is advised, that the seeds be carefully gathered when ripe, and not permitted to scatter, lest they grow and injure the old plants.

The roots continue many years without decaying; and it is said that the old roots of the true rhubarb are much preferable to the young ones.

These plants delight in a rich soil, which is not too dry nor over moist; and where there is a depth in such land for their roots to run down they attain a great size both in the leaves and roots.

Some cultivators think that the sowing is best performed in the later spring months; but in this way, as the seeds are slow in vegetating, there is much time lost. And a hot-bed has been sometimes employed, though it is not much advised.

The rhubarb plants may be also increased from offsets, separating some of the eyes or buds which shoot out on the upper parts of the root, together with a small part of the root itself, having some of the fibres to it. These offsets may be taken from roots of three or four years old, without any injury to the plant. By this method a year is saved, the plants are not in such danger of being devoured by vermin as those from seed, nor so uncertain in growing; they are not so tender, and only require keeping clear of weeds. There is no difference in the size of the roots thus raised, from those which grow from seeds. This method was practised by Mr. Hays, and in Mr. Hayward's practice several offsets were slipped from the heads of large plants in the spring, and set with a dibble about a foot apart. Four years after he took up the roots, and found them very large, and of excellent quality. "On further experience, when he took up his roots, either in spring or autumn, he divided the head into many parts; these he planted directly, at two feet distance, if intended for future removal; but if to remain for a crop, at four feet and a half."

In the culture of this root for medicinal uses the nature of the aspect is said not to be very material, provided it be not shaded too much on the south or west. The indispensable points are the depth and good quality of the soil, which should be light, loamy, and rich, but not too

much so, lest the roots be too fibrous: it can scarcely be too dry, for more evil is to be expected from a superabundance of moisture than from any actual want of it. If, with these advantages, the plantation can be placed on a gentle declivity, such a situation may be said to be the most desirable. Where a plantation does not possess the natural advantage of being on a declivity, narrower beds and deepened trenches are among the artificial means that should be adopted; but most situations will require some care to prevent the ill effects of water remaining on the crowns of the plants: therefore, when the seedstalks are cut off, which ought always to be done immediately upon the withering of the radical leaves, they should be covered with mould in form of a hillock. This process will answer two good purposes; that of throwing off the rain, and keeping open the trenches by taking the earth from them.

It is observed that, the injuries to which the young plants are most liable, are from slugs and other small vermin, from inattention to the season and manner of planting, and from too great an exposure to frost. Little damage is to be feared from heat; and in general they are hardy and easy of cultivation when arrived beyond a certain term.

It is advised to take great care of the nursery-bed, as the pains bestowed by constant waterings, and protecting the young plants from the ravages of insects, will amply repay the planter. Roots that thrive well here, will in three years arrive at an equal size with others, that have not succeeded so well, at the end of five. When a plantation is to be formed, or a vacancy filled up, select the finest and most thrifty plants. No plant will come to any thing when it has lost its principal bud.

It is observed, that there is a difference of opinion in respect to the age at which the roots ought to be taken up for use; but is probably best done from four to eight years.

It is best taken up in the autumn in a dry time, and should be immediately dried and prepared by cutting into pieces and cleaning.

Some plants of each of the sorts may also be introduced in the dry borders and clumps for the ornamental effect of the leaves and flowers.

RHEXIA, a genus containing plants of the hardy herbaceous perennial kind. It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Calycanthemæ*.

The characters are: that the calyx is a one-leaved perianth, tubular, ventricose at bottom, oblong, with a four-cleft border, permanent: the corolla has four roundish petals inserted into the calyx, spreading: the stamina have eight

filiform filaments longer than the calyx, and inserted into it: anthers declining, grooved, linear, blunt, versatile: the pistillum is a roundish germ: style simple, the length of the stamens declining: stigma thickish, oblong: the pericarpium is a roundish four-celled, four-valved, capsule, within the belly of the calyx: the seeds numerous, roundish.

The species are: 1. *R. virginica*, Virginian Rhexia: 2. *R. Mariana*, Maryland Rhexia.

The first rises with an erect stalk near a foot and half high, four-cornered and hairy: the leaves lanceolate, hairy, about two inches long, and half an inch broad, entire and opposite: the stalk has two peduncles coming out from the side opposite to each other at the upper joint, and is terminated by two others; these each sustain two or three red flowers with heart-shaped petals, spreading open in form of a cross, and appear in June. It is a native of North America.

The second species sends up an erect stalk about ten inches high: the leaves lanceolate, about an inch long, and a third part of an inch broad, set on by pairs; and from every joint of the stalk two short shoots come out opposite, with small leaves of the same shape; the whole plant is thick set with stinging iron-coloured hairs: the stalk divides at the top into two peduncles, spreading from each other, having one or two reddish flowers on each, with a single subsessile flower between them; they have four heart-shaped petals, which spread open as in the preceding. It flowers about the same time, and is a native of Maryland, Brasil, Surinam, &c.

Culture.—These plants may be increased by sowing the seeds procured from their native situations, in the autumn or spring, in pots filled with good fresh mould, placing them under the protection of frames, or if in a mild hot-bed they will be rendered more forward. When sown at the latter season, the plants seldom appear the same year. When the plants have attained sufficient growth they should be planted out partly in a dry sheltered east border and partly in pots, to have the protection of a frame against the frosts in winter. They flower the second year, and with care continue three or four.

They afford ornament in the borders as well as among flowery potted plants.

RHODIA. See **RHODIOLA**.

RHODIOLA, a genus comprising a plant of the low herbaceous, odoriferous, succulent perennial kind. It belongs to the class and order *Diœcia Octandria*, and ranks in the natural order of *Succulentæ*.

The characters of which are: that in the

male, the calyx is a four-parted perianth, concave, erect, obtuse, permanent: the corolla has four oblong obtuse petals, from erect-spreading, double the length of the calyx, deciduous. Nectaries four, erect, emarginate, shorter than the calyx: the stamens have eight awl-shaped filaments longer than the corolla. Anthers simple: the pistillum has four oblong acuminate germs. Styles and stigmas obsolete: the pericarpium is abortive: female: the calyx is a perianth as in the male: the corolla has four petals, rude, erect, obtuse, equal with the calyx, permanent. Nectaries as in the male: the pistillum is as four oblong acuminate germs, ending in simple straight styles: stigmas obtuse: the pericarpium has four horned capsules opening inwards: the seeds very many, roundish.

The species cultivated is: *R. rosea*, Common or Yellow Rosewort.

It has a very thick fleshy root, which when bruised or cut sends out an odour like roses; with many heads, whence in the spring come out thick succulent stalks about nine inches long, closely garnished with thick succulent leaves of a gray colour, an inch long, and half an inch broad, indented on their edges towards the top, and placed alternately on every side the stalk; which is terminated by a cluster of yellowish herbaceous flowers, male and female, on distinct plants appearing early in May. They have a very agreeable scent, but are not of long continuance. It is a native of Lapland.

There is a variety in which the roots are smaller; the stalks small, and not above five inches long; the leaves small, ending with a purple point; the petals are purplish, and the stamens little longer than the petals. It flowers later.

Culture.—This plant may be increased by planting cuttings of the stalks in the beginning of April, soon after they come out from the head, in a shady border; covering them close down with a glass, and keeping them dry, when they mostly put out roots in about six weeks; but the cuttings should be laid in a dry room at least a week before they are planted out, otherwise they are apt to rot, and be destroyed.

They may also be raised by parting the roots in the beginning of autumn, when the stalks begin to decay; and when the fleshy parts are cut or broken they should be laid to dry a few days before they are planted. They require a shady situation, and a dry undunged soil, in which they will continue many years. They afford variety in the borders, clumps, &c.

RHODODENDRUM, a genus containing plants of the hardy, deciduous, and evergreen, flowering, shrubby kinds, Dwarf Rose-bay.

It belongs to the class and order *Decandria*

Monogynia, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a five-parted permanent perianth: the corolla one-petalled, wheel-funnel-form: border spreading, with rounded segments: the stamens have ten filiform filaments, almost the length of the corolla, declined. Anthers oval: the pistillum is a five-cornered retuse germ. Style filiform, the length of the corolla. Stigma obtuse: the pericarpium is an ovate capsule, subangular, five-celled, divisible into five parts: the seeds numerous, very small.

The species are: 1. *R. ferrugineum*, Rusty-leaved Rhododendron: 2. *R. hirsutum*, Hairy Rhododendron: 3. *R. chamæcistus*, Dwarf Rhododendron, or Rose-bay: 4. *R. ponticum*, Purple Rhododendron: 5. *R. maximum*, Broad-leaved Rhododendron.

The first rises with a shrubby stalk near three feet high, sending out many irregular branches, covered with a purplish bark. The leaves are lanceolate, an inch and half long, and half an inch broad in the middle, entire, with reflexed borders, lucid green on their upper surface, and rusty-coloured underneath, placed all round the branches without order. The flowers are produced in round bunches at the ends of the branches: the corolla is funnel-shaped with a short tube, and is cut into five obtuse segments at the brim, spreading a little open, and of a pale rose colour. It is a native of Switzerland, flowering from May to July.

The second species seldom rises two feet high, and sends out many short woody branches, covered with a light brown bark. The leaves are ovate-lanceolate, about half an inch long, and a quarter of an inch broad, sitting pretty close to the branches; they are entire, and have a great number of fine ferruginous hairs on their edges and under side. The flowers are produced in bunches at the ends of the branches. The tube of the corolla is about half an inch long: the five segments of the brim are obtuse, spread half open, and are of a pale red colour. It is a native of the mountains of Switzerland.

The third is a small shrub, very much branched, the extreme branches leafy. The leaves are oblong, hard, on short reddish petioles. The peduncles one, or more, an inch long, villose, reddish brown, terminating. Calyx deeply five-cleft, of the same colour with the peduncle; the segments acute. The corolla purple, the segments ovate. The stamens longer than these. The style longer than the stamens. It is a native of Austria, &c.

The fourth species has an upright trunk, shrubby, commonly the height of a man, but



Painted by S. Edwards

London Published Dec. 1865 by G. Kneller, Fleet Street

Engraved by F. Heath

Rhododendron ponticum
1 Pontic Rhododendron

Robina hispida
2 Rose acacia

sometimes only half so high, frequently thicker than the human arm, very much branched from the bottom irregularly; the wood white, the bark ash-coloured. The branches round, scarred, with a smoothish testaceous bark. The leaves alternately scattered, coriaceous, large, quite entire, very smooth, becoming ferruginous underneath, scarcely nerved except the midrib, having a longitudinal streak on the upper surface, of a wide-lanceolate form, more attenuated towards the thick petiole. The flowering-buds formed in autumn for the year following, and consisting of ferruginous, ovate-acute, concave, very smooth, imbricate scales. The flowers in a short raceme at the end of the branchlets, about ten, and very handsome. It is a native of the Levant, flowering in May and June.

The fifth rises in its native soil, fifteen or sixteen feet high, with a shrubby stalk, sending out a few branches towards the top. The leaves stiff, smooth, six inches long and two broad, of a lucid green on their upper side, and pale on their under, whilst young; but afterwards changing to the colour of rusty iron: they have short thick footstalks, and are placed without order round the branches: between these the buds are formed for the next year's flowers; these swell to a large size during the autumn and spring months till the beginning of June, when the flowers burst out from their covers, forming a roundish sessile bunch or corymb. It is a native of North America, flowering here from June to August.

Culture.—These plants may be increased by sowing the seeds, which are very small, as soon as possible after they are procured, either in a shady border, or in pots filled with fresh loam, having them very lightly covered with a little fine mould, and plunging the pots up to their rims in a shady border, and in hard frost covering them with bell- or hand-glasses; taking them off in mild weather. When they are sown early in autumn, the plants come up the following spring, when they must be kept shaded from the sun, especially the first summer, and duly refreshed with water; in the autumn following removing them to a shady situation, on a loamy soil, covering the ground about the roots with moss, to guard them from frost in winter and keep the ground moist in the summer season.

They may also be increased from suckers or offsets, which they produce plentifully where they grow naturally, but seldom in this climate.

They are very ornamental in the border, clumps, and other parts of shrubberies.

RHUBARB. See **RHEUM.**

RHUS, a genus containing plants of the tree and shrub kinds; Sumach and Toxicodendron.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a five-parted perianth, inferior, erect, permanent: the corolla has five ovate petals, from upright spreading; the stamina have five very short filaments: anthers small, shorter than the corolla: the pistillum is a superior roundish germ, the size of the corolla: styles scarcely any: stigmas three, cordate, small: the pericarpium is a roundish one-celled berry: the seed one, roundish, bony.

The species are; 1. *R. coriaria*, Elm-leaved Sumach; 2. *R. typhinum*, Stag's Horn Virginian Sumach; 3. *R. glabrum*, Scarlet Sumach; 4. *R. elegans*, Carolina Sumach; 5. *R. copallinum*, Lentiscus-leaved Sumach; 6. *R. cotinus*, Venice Sumach; 7. *R. toxicodendron*, Trailing Poison-oak, or Sumach; 8. *R. vernix*, Varnish Sumach; 9. *R. radicans*, Rooting Poison-oak, or Sumach; 10. *R. tomentosum*, Woolly-leaved Sumach; 11. *R. angustifolium*, Narrow-leaved Sumach; 12. *R. lucidum*, Shining-leaved Sumach.

The first has a strong woody stem dividing into many irregular branches, and rises to the height of eight or ten feet; the bark is hairy, and of an herbaceous brown colour whilst young. The leaves are composed of seven or eight pairs of leaflets terminated by an odd one: these leaflets are about two inches long, and half an inch wide in the middle, and of a yellowish green colour. The flowers grow in loose panicles at the end of the branches, each panicle being composed of several thick spikes of flowers sitting close to the footstalks: they are of a whitish herbaceous colour, and appear in July. It grows naturally in Italy, Spain, &c.

The branches are used instead of oak-bark for tanning leather, and it is said that Turkey leather is all tanned with this shrub.

The second species has a woody stem, from which are sent out many irregular branches, generally crooked and deformed. The young branches are covered with a soft velvet-like down, greatly resembling that of a young stag's horn both in colour and texture, whence it has vulgarly the name of the Stag's Horn Tree. The leaves have six or seven pairs of leaflets, terminated by an odd one; their under surface and the midrib are hairy. The flowers are produced in close tufts at the end of the branches in July, and are followed by seeds, inclosed in purple woolly succulent covers, so that the bunches are of a beautiful purple colour in autumn: the

leaves also then change first to a purplish, and, before they fall, to a feuilletmort colour. It is a native of Virginia and Carolina.

The third is not so high as the second; the branches are much more spreading and smooth, the leaflets are wider and less serrate, they are of a deeper green, and have only a hoary cloud or bloom on the under surface, which may be wiped off with the fingers; whereas in that they are covered with a hoary pubescence; the panicle is more diffused. It is a native of North America.

There are several varieties; as the New England Sumach; in which the stem is stronger, and rises higher than that of the second sort; the branches spread more horizontally, they are not quite so downy, and the down is of a brownish colour; the leaves are composed of many more pairs of leaflets, and are smooth on both sides: the flowers are disposed in loose panicles, and are of an herbaceous colour. The Canada Smooth Red Sumach, which has smooth branches of a purple colour, covered with a gray pounce: the leaves are composed of seven or eight pairs of leaflets which are four inches and a half long, and one inch broad in the middle, terminating in acute points, and a little serrate, of a lucid green on their upper surface, but hoary on their under, and smooth: panicle large, composed of several smaller, each on separate footstalks, the whole covered with a gray pounce: the flowers are of a deep red colour.

The fourth species rises commonly to the height of seven or eight feet, and divides into many irregular branches, which are smooth, of a purple colour, and pounced over with a grayish powder; as are also the petioles, which are of a purplish colour. The leaves have seven or eight pairs of lobes, not always exactly opposite; they are three or four inches long, and almost an inch broad in the middle; above they are of a dark green, underneath hoary but smooth. The flowers of a bright red colour, in very close thick large panicles, appearing in July and August, and continuing till autumn. It is a native of South Carolina.

The fifth seldom rises more than four or five feet high, dividing into many spreading branches, which are smooth, of a light brown colour, and pretty closely furnished with pinnate leaves; these have four or five pairs of narrow leaflets, which are entire, two inches long and half an inch broad, ending in acute points; of a light green on both sides, and in autumn change to purple: the petiole has on each side a winged or leafy border, running from one pair of leaflets to another, ending in joints at each pair. The flowers are produced in loose panicles at the end

of the branches, of a yellowish herbaceous colour, and appear in July. It is a native of North America.

The sixth species rises with an irregular shrubby stalk to the height of ten or twelve feet, sending out many spreading branches covered with a smooth brown bark, garnished with single obovate leaves about two inches long, and of the same breadth, rounded at their points, and stand upon long footstalks; are smooth, stiff, and of a lucid green, having a strong midrib, whence several transverse veins run towards the border. The flowers come out at the end of the branches upon long hair-like footstalks, which divide and branch into large hair-like bunches of a purplish colour; are small, white, and composed of five small oval petals, which spread open. They appear in July. It is a native of the South of France, &c.

The root is used for dyeing: the leaves and young branches dye black; and the bark is used for tanning leather.

The seventh has the stalks rising higher than those of the ninth sort; the branches are slender but woody, and have a brown bark: the leaves are on pretty long petioles; leaflets oval, two inches long, one inch and a half broad, indented angularly, and hoary on their under side: the male flowers, which are produced on separate plants from the fruit, come out from the side of the stalks in close short spikes, and are of an herbaceous colour: the females are produced in loose panicles, agree in shape and colour with the males, but are larger and have a roundish germ supporting three very short styles. It is a native of many parts of North America.

The eighth species has a straight trunk: the leaflets four or five pairs, sometimes more, the upper surface green and smooth, the lower paler and pubescent, entire about the edge, or sometimes slightly sinuate, with oblique superficial veins, and the midrib inclining to the inner side, except in the odd leaflet, which it divides into equal parts: the petioles oblong, purple: from the base of these come out the peduncles, which are green, and bear many flowers in a racemed spike; these are small and herbaceous: fruit a juiceless drupe, slightly compressed. It is common in swamps in North America. Flowers here in July.

Martyn says, that "the milky juice stains linen a dark brown. The whole shrub is, in a high degree, poisonous; and the poison is communicated by touching or smelling any part of it."

The ninth has a low shrubby stalk, which seldom rises more than three feet high, sending out shoots near the bottom, which trail upon the ground, putting out roots from their joints,

whereby it multiplies and spreads greatly. If it be near a wall, the fibres will strike into the joints and support the stalks when severed from the root. When it is thus supported, the stalks become more woody, and rise much higher than when it trails on the ground. The petioles are near a foot long; the three leaflets are ovate-cordate, five inches long, three inches and a half broad, each on a short petiole; the two side ones oblique to the petiole, but the middle one equal; they have many transverse veins running from the midrib to the borders. The flowers come out from the side of the stalk in loose panicles, are small and of an herbaceous colour, male and female on distinct trees; the latter succeeded by roundish, channelled, smooth berries, of a gray colour, inclosing one or two seeds. It grows naturally in many parts of North America, and flowers in July.

Having, in common with ivy, the quality of not rising without the support of a wall, tree, or hedge, it is called in some parts of America Creeping Ivy. It will climb to the top of high trees in woods, the branches every where throwing out fibres that penetrate the trunk. When the stem is cut, it emits a pale brown sap of a disagreeable scent, and so sharp that letters or marks made upon linen with it cannot be got out again, but grow blacker the more it is washed.

Like *Rhus vernix* it is poisonous to some persons, but in a less degree. Kalm relates, that of two sisters, one could manage the tree without being affected by its venom, whilst the other felt its exhalations as soon as she came within a yard of it, or even when she stood to leeward of it at a greater distance; that it had not the least effect upon him, though he had made many experiments upon himself, and once the juice squirted into his eye; but that on another person's hand, which he had covered very thick with it, the skin, a few hours after, became as hard as a piece of tanned leather, and peeled off afterwards in scales.

There is a variety with a straight and stout trunk, having a brownish ash-coloured bark: the leaves smooth, veined, bright green above, somewhat paler underneath, pendulous, and somewhat bent back: in the male plant the leaves are rather wider and longer, and are drawn more to a point; in the female they are shorter and blunter, and the petioles are reddish, whereas in the other they are green: the flowers axillary, in racemes; the males larger, whitish yellow; the females smaller, herbaceous, on the germ instead of the style there are two, sometimes three black dots: fruits round, the size and form of coriander seeds, streaked with five lines, remaining on the tree till new flowers

come out; when the outer rind comes off, and a cretaceous substance comes into view, in which an ash-coloured, hard, horny seed is involved, slightly divided on the upper part, and somewhat kidney-shaped.

The tenth rises with a woody stalk to the height of seven or eight feet, covered with a brown bark, and having many irregular branches: the leaves on long petioles: the leaflets angular, near two inches long and one inch broad, dark green above, downy underneath: the flowers come out in slender bunches from the side of the branches, are of a whitish herbaceous colour, and soon fall away. It is a native of the Cape.

The eleventh species rises with a woody stalk seven or eight feet high, dividing into several irregular branches, covered with a dark brown bark: the leaves are on pretty long footstalks: the leaflets two inches long and half an inch broad in the middle, ending in acute points, lucid green above, but downy underneath: the flowers are produced in small loose bunches from the side of the branches; are small and herbaceous. It is a native of the Cape.

The twelfth rises with a woody stalk dividing into many branches, covered with a brown bark: the leaflets are of a lucid green colour. It is a native of the Cape, flowering in July and August.

Culture.—The first nine of these plants are capable of being raised by seeds and layers, and some of them also by suckers, or their rooting branches.

In the first method, such of them as do not send up suckers should have the seed procured from abroad, and sown in pots of a large size or in beds of light mould, being covered in about the depth of half an inch in the autumn. Those in pots should be protected from the frosts during the winter, and if plunged in a moderate hot-bed in the early spring they will be rendered more forward, letting the plants have a free air when they appear. Those in the open ground often remain long before they vegetate; they should be kept free from weeds, be well watered in summer, and have the protection of mats the first winter. When the plants have had the growth of a year or two they may be planted out in nursery-rows till fit to be set out in the places where they are to remain. The potted plants should have the protection of the frame the second winter, air being freely admitted in mild weather: and in the spring following they may be shaken out of the pots without injuring the roots, and be set out in nursery-rows, three feet apart, and a foot distant in the rows, where they may remain two years, and then be planted out where they are to remain.

Such sorts as have young branches sufficiently low, may have them laid down in the autumn in the slit method; when they will mostly have stricken root in the course of a year, and may be taken off and planted out where they are to remain, or in the nursery.

Those sorts that send up suckers from the roots should have them taken up during the winter, and planted out in nursery-rows in the manner of the seedlings, till of a proper growth to be planted out.

The seventh and ninth sorts may likewise be increased by their trailing branches, which have stricken root as they rest on the ground, which should be taken up with their roots entire in the autumn, winter, or any early spring, and be planted out either where they are to remain or in nursery-rows, till of sufficient growth for the purpose they are intended.

The first and fourth sorts being the most tender require the most sheltered situations.

Most of these plants afford a milky juice, which is extremely acrid and corrosive.

The three last sorts may be raised by cuttings and layers with great facility.

In the first method, the cuttings of the young shoots should be planted out in pots of light fresh mould, in the spring and early summer months, plunging them in a moderate hot-bed, where they readily strike root, being occasionally watered and shaded; and when they have formed good roots they may be potted off into separate pots.

In the latter mode any of the young wood may be laid down in the usual manner, in the early spring, when by the autumn they will mostly have stricken good root, and may be taken off, and be potted out the same way as the cuttings.

The first nine sorts have a fine effect in mixture with other deciduous shrubby plants, in the borders, clumps, and other parts of pleasure-grounds; and the three last afford variety among other potted green-house plants of the less tender kinds.

RHUS COBBE. See **SCHMIDELIA**.

RIBES, a genus containing plants of the hardy deciduous shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved perianth, half-five-cleft, ventricose: segments oblong, concave, coloured, reflex, permanent: the corolla has five, small, obtuse petals, erect, growing to the margin of the calyx: the stamina have five, subulate, erect filaments, inserted into the calyx: anthers incur-

bent, compressed, opening at the margin: the pistillum is a roundish germ, inferior: style bifid: stigmas obtuse: the pericarpium is a globose berry, umbilicated, one-celled: receptacles two, lateral, opposite, longitudinal: the seeds very many, roundish, somewhat compressed.

The species cultivated are: 1. *R. rubrum*, Common Currant; 2. *R. nigrum*, Common Black Currant; 3. *R. Grossularia*, Rough-fruited Gooseberry; 4. *R. Uva crispa*, Smooth-fruited Gooseberry; 5. *R. reclinatum*, Procumbent Gooseberry; 6. *R. oxyacanthoides*, Hawthorn-leaved Currant; 7. *R. cynosbati*, Prickly-fruited Currant.

The first has smooth branches: the leaves on longish petioles, doubly serrate, subpubescent: the racemes simple, nodding, when in fruit pendulous: the bracte ovate, small, shorter than the pedicels: the corolla yellowish green, with obcordate petals: the berries acid, shining. It is a native of Europe, flowering in May.

It is observed by Martyn, that this shrub is very apt to be infested with the *Aphis Ribes*, in which case the green leaves become red, pitted, and puckered. It has been long cultivated in the garden and greatly improved. There are several varieties: as the common sort with small red fruit; with white fruit, with pale fruit, commonly called the Champaign Currant, differing only in being of a pale red or flesh colour. But since the White and Red Dutch Currants have been introduced and become common, the old sorts have been almost banished, and are now rarely to be found.

Mr. Forsyth mentions the Fine new white Dutch, Long-branched red, Striped-leaved red white Currant, and Large pale and red Dutch.

There are also the Sweet Currant, the Small-fruited Currant, and a variety with blotched leaves, which is kept in some plantations; but as the variegation is apt to go off when the plant is vigorous, it scarcely deserves a place in them.

The second species is distinguished by its more humble habit, its strong-smelling leaves glandular underneath, its hairy racemes, tubular calyx, and black fruit, but especially by its solitary, one-flowered peduncle at the base of the raceme, and distinct from it: the buds are glandular: the bractes woolly, and as long as the pedicels: the flowers villose, turban-shaped; the petioles also subvillose and glandular. It is a native of most parts of Europe, flowering in May.

There is a sort often termed the American Black Currant. The berries have a very peculiar flavour, which many persons dislike; but are commonly eaten in puddings in some parts, and make a tart little inferior to the Cranberry.

The juice is frequently boiled down to an extract, with the addition of a small proportion of sugar; in this state it is called Rob, and used in sore throats.

Currants are by some supposed the most useful of all the small fruits, either for table or culinary uses, as well as for wine, continuing long in succession with due management. The black sort is seldom sent to table.

This sort may be infused in spirit of any kind, in which way they make a good liquor.

The third is a low branching shrub: the prickles under the buds one, two, or three: the leaves three-lobed, gashed, subpubescent: the petioles hairy, commonly longer than the leaves: the peduncles one-flowered, nodding, having one, two or three opposite ovate ciliate bractes in the middle: the germ villose: the berries pendulous, hairy.

It is observed by the editor of Miller's Dictionary, that if the bractes do not distinguish this from the following, the roughness or smoothness of the berries will hardly do it, as Mr. Robson has found that seeds from the same plant will produce both rough and smooth fruit. He cannot regard them as different species. It is a native of several parts of Europe.

The fourth sort has the buds woolly: the calyx bent back: the peduncle woolly: the bracte ovate, embracing, generally with three divisions: the flowers solitary, pendent: the stipule, ciliate with knobbed hairs: a triple thorn beneath the buds: the berry crowned with the permanent calyx, peduncled, pulpy, subdiaphanous, pale, amber-coloured, red or purple, smooth, the pulp watery and sweet: receptacles formed of the skin of the berry thickened, oblong, narrow; with filiform umbilical chords, the length of the seeds, and inserted into their inner and blunter extremity: seeds as far as thirty, ovate-oblong, with a pellucid jelly about them, rufescent. It is a native of the northern parts of Europe.

Martyn remarks that the Gooseberry seems to have been formerly a fruit in very little esteem, but has received so much improvement that it is now become valuable, not only for tarts, pies and sauces, both fresh, and preserved in bottles, but as an early dessert fruit, and preserved in sugar for winter use, to answer the same purpose.

The most important varieties are of the Red kind; the hairy, smooth, deep red, damson or dark-red blueish, red raspberry, early black-red, Champagne, &c.

Of the Green kind; the hairy, smooth, Gascoigne, raspberry, &c.

Of the Yellow kind; the great oval, great

amber, hairy amber, early amber, large tawney or great mogul, &c.

Of the White kind; the common, white-veined, and large crystal.

But besides these, there is the rumbullion, large ironmonger, smooth ironmonger, hairy globe, and innumerable others, some of very large size, annually raised from seed, weighing from ten to fifteen pennyweights, but there are small ones better tasted. There are said to be upwards of two hundred, at least in name.

Mr. Forsyth gives the following list from the Catalogue of Messrs. Kirk, Nurserymen, at Brompton, near London:—

Supreme Red, Perfection Red, High Sheriff of Lancashire, Royal George, Unicorn, Rough Amber, White Walnut, Ackerley's Double Bearer, Royal Oak, Miss Bold's, Sparkler, Akerley's Rodney, Hampson's Cæsar, Monk's Charles Fox, St. John, Pigeon Egg, Worthinglowe's Conqueror, Golden Eagle, Royder's Triumph, Williamson's Yellow Hornet, Swingham, Jackson's Golden Orange, Goliath Champion, Warrington Red, Golden Drop, Costerdiner Goliath Champion, Hairy Amber, Nixon's Golden Eagle, Worthington's White Lily, Laylord's Seedling, Nixon's White Heart, Riding's Old England, Bakeley's Swingham, Tiliotson's St. John.

And he adds another "list of the largest new sorts shown in Lancashire in the summer (1800), with their colour and weight, as communicated by Messrs M'Niven, nurserymen, Manchester:—

<i>Red Gooseberries.</i>	dw.	gr.
Alcock's King —	16	13
—— Duke of York —	16	1
Boardman's Royal Oak —	15	4
Brundrit's Atlas —	17	1
Chapman's Peerless —	15	21
Dien's Glory of England —	16	2
Fairlow's Lord Hood —	14	5
Fisher's Conqueror —	17	19
Fox's Jolly Smoker —	15	8
Hall's Porcupine —	13	20
Lomax's Victory —	16	11
Mason's Hercules —	13	16
Taylor's Volunteer —	16	17
Worthington's Glory of Eccles —	14	10

<i>Yellow Gooseberries.</i>	dw.	gr.
Brundrit's Sir Sidney —	15	22
Davenport's Defender —	15	12
—— Creeping Ceres —	16	0
Hannet's Kilton —	15	9
Hill's Golden Gourd —	13	17
—— Royal Sovereign —	17	10
Leigh's Prince of Orange —	15	0
Parkinson's Goldfinder —	14	5

R I B

Robinson's Crudus	—	—	dw. gr.	13 17
Withington's Sceptre	—	—		13 7

Green Gooseberries.

Blakeley's Chissel	—	—		17 0
Boardman's Green Oak	—	—		14 1
Brundrit's Tickle Toby	—	—		14 6
Chadwick's Hero	—	—		13 10
Dean's Lord Hood	—	—		15 10
Mill's Langley Green	—	—		16 2
Read's Satisfaction	—	—		15 4
Robinson's Stump	—	—		13 21
Smith's Green Mask	—	—		13 20
Yates's Duke of Bedford	—	—		14 11

White Gooseberries.

Adams's Snow Ball	—	—		12 22
Atkinson's White Hall	—	—		14 8
Chapman's Highland White	—	—		12 0
Davenport's Lady	—	—		15 0
Gibson's Apollo	—	—		14 20
Holding's White Muslin	—	—		13 0
Kenyon's White Noble	—	—		13 6
Moor's White Bear	—	—		14 19
Woodward's White Smith	—	—		17 2

In favourable seasons, he says, many of the above sorts have been known to weigh more by several pennyweights."

The fifth has the leaves not only wider, but of a darker colour; prickles to each leaf one or two, but sometimes none; short and much weaker than in the common Gooseberry, besides others that are harmless and much shorter scattered over the branches: the fruit when ripe commonly dark purple, but sometimes red or even yellow. It is a native of Germany, flowering in April, and the fruit ripening in June and July.

The sixth species has more frequent and milder prickles than the common Gooseberry; the leaves are smooth and more deeply cut; the fruit small and round, the size and shape of a Currant; colour at first purple, but when ripe dark purple with a blue bloom; it is smooth, on a short slender peduncle; the pulp subacid, dusky purple, with one or two brown seeds, of a round form slightly angular. The stems are ash-coloured, with frequent slender brownish prickles, like the Burnet Rose, but less rigid; the young shoots are pale green, and have green prickles: the flowers one or two from an axil, white and yellowish white. It is a native of Canada, flowering in April and May.

The seventh has the appearance of the other species, but the leaves are little gashed: the prickles like a thorn under the axils: the peduncles generally three-flowered: the germ in the flower hairy, but not prickly. It has the corolla of the third sort: the berries the size of

R I B

a hazel-nut, armed all over with stout prickles. It is a native of Canada, flowering in April.

Culture in the Currant Kind.—These may be raised with great facility from layers, seed, cuttings, &c.

In the first mode, when the trees are cut low, Mr. Forsyth advises the laying down some of the branches either in the winter or spring seasons, when the ground in the quarters or rows is dug, which should always be done annually. In the autumn following, these layers will have made fine roots; then they may be planted out where they are to stand, and they will mostly bear fine fruit in the following summer.

In the second method, the cuttings should be chosen of the strongest and straightest shoots, which should be cut six or eight inches in length, and be planted out on an east or north border, in the early autumn, at the distance of a foot from row to row, leaving only a few inches out of the ground. In this way they may be kept perfectly free from weeds. In dry weather, during the spring, they should be often refreshed with water. Some also raise these plants from suckers, but this is a method that should be avoided as much as possible, as they never grow handsome, and are apt to throw out suckers.

In respect to the seed, it should be sown on a border where the mould is fine, either in the autumn or early in the spring, and the young plants when they appear kept free from weeds. When they have attained sufficient growth they may either be planted out where they are to remain, or be set out in nursery-rows.

But Mr. Forsyth observes, that under the bushes that have been covered for late fruit, plenty of self-sown plants may constantly be found, which he advises to be planted out by themselves. And those who make currant-wine, may, he says, save the seed, after the fruit is squeezed, and dry it: it may then be sown in the manner directed above, by which, most probably, some fine varieties may be obtained. As in many gardens there still remains, the same writer says, a small sort of red and white currant not worth cultivating, he would advise those who have any of them to root them up, and plant in their room, the large red and white Dutch, the long-bunched red, and Champagne large pale red.

These plants may be planted out; Mr. Forsyth says, either in quarters or single rows round the edges of the quarters, in the gardens or other places.

And he "would particularly recommend planting a few against a south or west wall, or paling, which will produce fruit much earlier than in quarters, &c. Also to plant some be-

tween other fruit-trees on north walls, or palings, for later crops; these may be covered with double nets, to preserve them from birds; tucking in a few fern branches between the two nets, which will prevent the heat of the sun and drying winds from shrivelling the fruit. In the quarters they should be covered with mats for the same purpose; at the same time permitting all the leaves to remain on the bushes, to shade the fruit and make it keep the longer in a proper state."

In regard to the pruning of the bushes, the work may, according to the above author, "be begun in the month of November, and continued till March, as it suits the planter's convenience. And they should never be left too thick of wood; but a great deal depends on the management of them in summer, to have strong and fine wood for the following season. If they have been neglected for some years, and suffered to run up to long naked wood, they must, he says, be cut down near the ground; they will then set forth fine strong shoots. In this case, he would recommend heading down every other tree, and cutting the others partially, by taking out every other branch as near as can be to the ground, unless they are trained up with single stems, in which case it will be necessary to cut them as near as possible to where the branches begin to break out and form the head."

And "in the winter pruning, the strongest and finest shoots should be preserved, leaving them from nine to eighteen inches long, according to their strength, and from eight to ten inches apart, and as regular as possible from top to bottom of the tree; taking care to cut out all the dead and weak shoots." And "particular attention should be paid in summer, keeping the middle of the bush open to admit the sun and air; preserving the finest and strongest shoots that are nearest the stem. Some, he says, are fond of training them up with single stems, to a considerable height, to form fine round heads, which are very ornamental, if not suffered to run up too high; as in that case they are liable to be broken by the wind, if not well supported by stakes. Care must be taken not to let the shoots run to more than six inches long, because such short shoots will not be so liable to be damaged by the wind as long and weak ones are, especially when loaded with fruit. He prefers dwarfs from three to four feet high."

It is added, that "the same manner of pruning, &c., will do for Black Currants; but, as they grow stronger than the red or white, the shoots should be left thinner, and laid in longer, which will make them produce larger and finer fruit." And "those against walls and palings

should have the shoots laid in thinner than those in the quarters, and trained as horizontally as possible, shortening them in the winter pruning to a foot or eighteen inches, according to the strength of the shoots."

And as this sort of fruit "is very liable to be devoured by earwigs, which take shelter under their leaves and branches, bundles of bean-stalks should, he says, be hung up some time before the bushes are covered with mats or nets. If proper attention be not paid to this, the fruit will generally suffer very much from these insects. After the bushes are covered, take the mats off once in three or four days, and kill the earwigs that have got into the bean-stalks, which it will be necessary still to keep hung up. As there is a sweetness in the inside of beanstalks which attracts the earwigs, they very readily take shelter in them from rain. By proper attention to these directions, these destructive insects may be kept under, and the greater part of the fruit be preserved."

It is also necessary to carefully stock up all suckers at the roots of the trees, and keep them as clean as possible, otherwise they will prevent the sun and air from penetrating to the roots, and greatly weaken and injure the trees.

These plants are very liable to be infested with aphides and other insects, from which they should be freed as soon as possible, by proper picking, washing, and liming.

Culture in the Gooseberry Kind.—These are capable of being raised by cuttings and layers, as well as seeds for new varieties. They are likewise sometimes increased by suckers; but this last is not an advisable method, as the plants raised in this way are more apt to throw out suckers than those from cuttings or seed.

The cuttings should be made from the strongest and cleanest shoots, and have the length of seven or eight inches, being planted out in the early autumn, in a border which has an eastern or northern aspect, at the distance of about a foot from row to row, and having only about three or four inches of each cutting above the ground; as by this means they may be kept clean by hoeing. They require to be frequently watered in the spring season, when the weather is dry.

The layers may be laid down any time in the autumn or spring season, in the common way, when they readily strike root, and in the following autumn may be taken off and planted out where they are to remain, or in nursery rows, to get strength to be finally planted out.

The seed obtained from the ripened berries should be sown in the autumn or very early spring, in a bed of fine light mould; the

plants come up readily, and should be kept perfectly clear from weeds; and when they have had one or two years growth may be removed into nursery-rows, in the same manner as the Currants, to remain till they become fit for being planted out.

In this way good new varieties may be procured. Mr. Forsyth remarks, that the gardeners in the vicinity of Manchester have made great additions to the varieties of this fruit, and by mixing up a rich soil to plant them in, carefully watering, shading, and thinning the fruit, have brought the berries to a size much larger than had been before met with in this country; but that some of the layers are much thicker in the skin, and not so well flavoured as many of the old sorts.

The methods of planting out this sort of plants are extremely various. According to Mr. Forsyth, the market gardeners in the vicinity of the metropolis set them out in rows from eight to ten feet apart, and six from plant to plant. In cases of this sort he recommends that they should be pruned in the autumn, as about the beginning of October, when the ground between may be planted with coleworts, or beans for a spring crop; and by so doing, there will be no occasion to tread over the ground and hurt the coleworts in pruning the bushes; as before the Gooseberries begin to shoot, the coleworts will be all cleared off the ground.

And after this time (or before if you find it convenient), a good coat of rotten dung should be laid on the ground; then dig it and plant early potatoes; but not so near as to hurt the Gooseberries by their growth.

He likewise advises that the roots of Gooseberries should be kept clear to admit the sun and air. In small gardens he would recommend planting them in a quarter by themselves, at the distance of six feet between the rows, and four feet from plant to plant: they may be planted round the edges of the quarters, about three feet from the path; in which case the ground will be clear for cropping, and a man, by setting one foot on the border, can gather the Gooseberries without injuring the crop that may be on the border.

And that, as they like a rich soil, they should be dunged every year, or at least have a good coat of dung once in two years. They should never be planted under the shade of other trees, as it injures the flavour of the fruit.

In respect to the pruning of the bushes, "it is a practice too common, Mr. Forsyth says, to let them branch out with great naked stems, suffering them to remain in that state for years. When that is the case, they should be cut down

near to the ground in the winter pruning, as it will make them throw out fine strong healthy shoots, which will bear fruit the second year: and as Gooseberry-bushes, in general, bear their fruit on the second year's wood, great care should be taken in summer to keep the middle of the bush clear to admit a free air, leaving the finest and strongest shoots from six to ten inches distant from each other. This will, he says, help to ripen and harden the wood. It is a practice with some to shorten the shoots in the autumn or winter pruning, which should be always near to a wood-bud; which may be known by its being single, whereas fruit-buds are in clusters. The shoots may, he thinks, be shortened to eight or ten inches, according to their strength. Some leave them at full length for three or four years, thinning out those that are superfluous. He advises always to leave a proper number to be trained up between the full-length shoots, to succeed them when they are tired of bearing; and then to cut the old ones down to the young ones that are to succeed them. By these means the bushes may always be kept in a constant state of bearing."

Those branches which were cut the first year, will in the second throw out short dugs, or spurs, which produce the fruit; and these should by no means be cut off, unless the branches are in a sickly state, and require to be cut close down when the bushes are overloaded with fruit. "It will then, he says, be necessary to cut out a good deal of the old wood, to assist nature to recover herself after producing so great a quantity of fruit."

He advises that "great attention be paid to the cultivation of the early and late sorts. In some old gardens, in particular, there are, he says, very valuable sorts that have been of late too much neglected; he would therefore recommend to those who live in the neighbourhood of such gardens, to observe their time of ripening, and to cultivate those especially which are early and late."

He adds, that "it is a practice with some to clip the tops of Gooseberries with a pair of garden shears, as they would clip a thorn hedge; this he by no means approves of, as the fruit will not be half the size, nor of so fine a flavour, as when the bushes are kept clear of such wood as is unnecessary."

It is recommended that great "care should be taken in spring and summer to stock, or grub up, all the suckers from the roots of the bushes, leaving their stems clear and unencumbered. And as many of the Lancashire sorts are apt to grow horizontally, and the branches frequently trail on the ground, which renders them

liable to be broken by high winds, especially when they are loaded with fruit, he would recommend two or three hoops to be put round them, to which the branches may be tied, to support them, and prevent their being broken by the wind, or any other means."

When it is wished to have them very late, they should be planted on north walls and parlings, between the other trees, when they may be removed as the trees begin to meet. If laid in thin, they will bear very fine and handsome fruit. He would advise to plant the finest late sorts; as by this method the table will be supplied much longer than by the common custom of planting in quarters of the garden.

And "immediately after pruning, he always applies the Composition to the ends of the shoots and cuttings; and he finds it of great use in preventing the exhalation of the sap, and preserving the cuttings till they take root and become established."

These sorts of plants are very much infested with a small green caterpillar, which frequently devours both leaves and fruit: great attention is of course necessary to observe their first appearance on the bushes; as, if not destroyed early, they increase so fast, that they soon devour all the leaves, and the fruit is good for nothing. It is observed, that "they first appear generally on the edges and under-sides of the leaves."

In order to destroy them, he advises to "take some sifted quick-lime and lay it under the bushes; but not at first to let any of it touch the branches or leaves; then shake each bush suddenly and smartly, and the caterpillars will fall into the lime; if the bush be not shaken suddenly, the caterpillars, on being a little disturbed, will take so firm a hold as not easily to be shaken off. After this is done, some of the lime should be sifted over the bushes; this will drive down those which may have lodged on the branches. The caterpillars ought, he says, to be swept up next day, and the bushes well washed with clear lime-water mixed with urine; this will destroy any caterpillars that may still remain, and also the aphides, if there are any on the bushes at the time."

Forcing.—Sometimes trees of the gooseberry and currant kinds are forced for early fruiting, by means of artificial heat in fruit-forcing-houses, hot-walls, or forcing-frames, &c. For this purpose, some young trees should be planted in largish pots, one plant in each, and being advanced to a full state of growth for plentiful bearing, should be introduced in any of the above forcing departments that are in work by fire, or hot-bed heat, or both, in forwarding

any principal sorts of fruit-trees, plants, or flowers, at the proper season, as about January or February, in which the same culture, in regard to the degree of heat, and other requisites, necessary for the other trees, &c., is suitable for these. Water should be given occasionally to the earth in the pots, and sometimes after the fruit is set, throwing it lightly over the branches on a warm sunny day; and they will thus produce ripe fruit in April or the following month.

The forcing of this sort of fruit is now however seldom much attended to.

RICINUS, a genus containing plants of the tall herbaceous tender annual kind.

It belongs to the class and order *Monocotyledon*, and ranks in the natural order of *Tricocceae*.

The characters are: that in the male the calyx is a one-leaved, five-parted perianth: segments ovate, concave: there is no corolla: the stamina have very numerous filaments, filiform, branching collected below into various bodies: anthers two, roundish:—females on the same plant: the calyx is a one-leaved perianth, three-parted: segments ovate, concave, deciduous: there is no corolla: the pistillum is an ovate germ, covered with subulate corpuscles: styles three, two-parted, from erect spreading, hispid: stigmas simple; the pericarpium is a roundish capsule, three-grooved, prickly all over, three-celled, three-valved: the seeds solitary, subovate.

The species cultivated is *R. communis*, Common Palma Christi.

It rises with a strong herbaceous stalk to the height of ten or twelve feet; the joints are at a great distance from each other; the stalk and branches are of a gray colour; the leaves large, and on long footstalks; deeply divided into seven lobes, and are gray on their under side. The flowers are disposed in long spikes, which spring from the division of the branches: the males are placed on the lower part of the spike; the females, which occupy the upper part, have prickly calyxes: the root is biennial, long, thick, whitish, and beset with many small fibres. It is a native of the Indies, flowering here in July and August.

It becomes a tree in its native situation, and the seeds afford the castor oil of the shops.

There are several varieties, as the Great American Palma Christi, which has brown stalks that divide into two or three branches, and rise six or seven feet high; the leaves are broader, and not so deeply divided; they are of a deep green on both sides, and are unequally serrate. The spikes of flowers are shorter, the seed-vessels rounder and of a brownish colour, and

R I C

the seeds are much less, and brown. It is a native of the West Indies.

The Green-stalked American Palma Christi, which has a thick herbaceous stem, of a grayish green, with the joints not so far asunder as in the preceding sorts: it rises about four feet high, and is divided at the top into three or four branches, which spread out almost horizontally: the leaves are large, of a deep green on their upper side, but grayish on their under; they are deeply cut into six or seven (sometimes eight) lanceolate segments, which are unequally serrate: the petioles spread out more horizontally than those of the common sort, and are much shorter: the principal stalk and branches are terminated by loose spikes of flowers: the covers of the capsules are green, and closely armed with soft spines: the seeds are smaller and lighter coloured than those of the preceding. It is also a native of the West Indies.

The Wrinkled-capsuled Palma Christi, which rises with an herbaceous stalk about four feet high: the lower part is purplish, and the upper deep green, the joints pretty far asunder: the leaves are of a deep green on their upper side, but paler underneath; they are not so deeply divided as some of the others, and are more regularly serrate: the spikes of flowers are large: the males have more stamens, with yellow anthers: the capsules are oval and wrinkled, but have no prickles: the seeds are small and brown. It is a native of both Indies.

The Red-stalked Palma Christi, which rises with a large reddish stalk to the height of ten or twelve feet, with many joints, and dividing into several branches: the leaves are very large, some measuring more than two feet and a half in diameter; are of a dark green, unequally serrate, and not so deeply cut as in some of the varieties: the spikes of flowers are large, and brown, with whitish anthers: capsules large, oval, and closely set with soft prickles: the seeds are very large, and beautifully striped. It is a native of Africa and both Indies.

The Small American Palma Christi, of which there are two sub-varieties, one with a red, the other with a pale-green stalk, distinguished in America by the names of Red and White Oil-seed: the stems seldom rise more than three feet high, sometimes dividing at the top into two or three branches: the leaves are much smaller and more deeply divided than in the other varieties; their borders are unequally serrate, and the segments of the leaves are frequently cut on the sides: the spikes of flowers are smaller and more compact: the capsules are also smaller, rounder, of a light green, and closely set with soft prickles:

R I D

the seeds small, and finely striped. It is a native of Carolina, &c.

The Livid-leaved Palma Christi, which is an evergreen tree, ten feet in height, and more: the trunk, during the first year, is blood-red and very shining; afterwards it becomes woody, as thick as the wrist, hollow with transverse septa, pithy, with circular warts at the joints from fallen stipules, ash-coloured, interruptedly and slightly streaked: before the leaves come out, they are wrapped up in red stipules like sheaths, that fall off soon after: the leaves are divided half way into eight, sometimes ten lobes, which are serrate and acute, and the petiole is long; they are of a dark blood-red colour on the upper surface, and livid on the lower, with blood-red veins, the largest less than a foot in diameter, quite smooth, without any hairiness whatever: the fruit of a livid colour, with long soft prickles: the seeds shining, variegated with black and brown. It is a native of the East Indies.

Culture.—These plants are capable of being increased by seeds, which should be sown upon a hot-bed in the spring, and when the plants are come up, be each planted into a separate pot filled with light fresh earth, and plunged into a fresh hot-bed, watering and shading them until they have taken root; after which they must have a great share of free air when the season is mild, otherwise they draw up tall and weak. As the plants grow fast, and their roots in a short time fill the pots, they should be shifted into larger pots, filled as above; and about the end of May, when the season is warm, be hardened to endure the open air by degrees; when, if some of the plants be shaken out of the pots, and planted out into a very rich border, and in dry weather duly watered, they grow to a large size, and produce a great quantity of flowers and seeds. If it be intended to preserve any of the plants through the winter, they must not be planted out in the full ground, but be shifted into larger pots occasionally, as their roots require, placing them in the open air during the summer season in some warm situation, where they may remain until October, when they must be removed into the green-house with other exotic plants, watering them sparingly in winter, and admitting free air in mild weather, as they only require to be protected from frost and cold winds.

They have a fine ornamental effect in their leaves among other potted green-house plants, and also in the large open border or clumps, when cultivated as annuals, but they require room.

RIDGING OF GROUND, the practice of

throwing it up into high ridges, in order to lie fallow in winter, &c., to mellow, and improve in its quality and fertility.

This is work of great utility in the kitchen garden, as well as in other parts, but more especially in stiff and heavy soils, and cold wet lands. It is accomplished by trench-digging the ground over, laying the earth of each trench in a raised, rough ridge, lengthways, that by thus lying as high, open and hollow, as possible, it may meliorate and fertilise more effectually by the weather during the winter. And it receives further improvement from the levelling it down again, which is expeditiously effected, for the reception of the intended seeds, plants, roots, &c., which breaks, divides, and pulverises the earth still more effectually.

This ridging is generally performed either in the latter end of autumn, or any time in winter, or early in the spring, as the ground is the most vacant at those seasons, and not generally immediately wanted for any principal sowing or planting.

This sort of work is executed by beginning at one end of the plat of ground, and digging out a trench one or two spades in width, and a full spade's depth, removing the crumbs from the bottom, in the length-ways across the ground, and wheeling the earth to the finishing end, to be ready to fill up the last trench: so marking out a second trench close to the first, of the same width, then proceeding in the trenching and ridging, previously paring the top of the second trench, with all weeds, rubbish, or dung thereon, if any, into the bottom of the first, and then digging the ground of the second along regularly, the proper width and depth as above; turning the earth spit and spit into the first open trench, laying it in a raised ridge lengthways thereof, without breaking it fine, so that it may lie somewhat rough and hollow, according as the nature of the soil may admit: proceeding thus with another trench in the same manner, and continuing the same with the whole, trench and trench, to the end of the plat of ground; filling up the last trench with the earth of the first opened, laying it now ridge-ways as in the preceding trenches.

In the work of levelling down ridged ground, as wanted, it should proceed regularly, ridge and ridge, long-ways, levelling the earth equally to the right and left, loosening any solid parts, and breaking all large rough lumps and clods moderately fine; forming the whole in an even regular surface, in order for sowing and planting as required.

And in general, it is not advisable to lay down more than can be sown the same or next day,

while the surface is fresh stirred, especially in broad-cast sowing and raking in the seed, as most generally all tolerably light mellow soils are more yielding to the rake while the surface is fresh moved; or before rendered wet by rain, &c., or very dry and hardened in the top earth by the sun, air, and winds, in dry weather, in the spring months, &c., and likewise, for sowing seeds by bedding in and covering in with earth from the alleys, &c., or with earth raked off the beds for that purpose, it would generally be most successful to perform it in a fresh stirred surface; though it is not so material in drill sowing: and besides, when seeds are committed to the earth while it is in a fresh turned up surface, especially in a dry season, they are more forwarded in a free regular germination than in ground that has lain some time after digging or levelling down. Though some grounds of a wet, or heavy, stiff nature, sometimes require to lie a few days after digging or levelling down, in order for the rough cloddy surface to mellow in some degree, either by drying a little, or by having a moderate rain, or sometimes both, to meliorate the lumpy clods, pliant to the rake, in the case of broad-cast sowing and raking in the seed.

RIVINA, a genus containing plants of the shrubby evergreen kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Holoraceæ*.

The characters are: that the calyx is a four-leaved perianth, coloured, permanent: leaflets oblong-ovate, blunt: there is no corolla, unless the calyx be taken for it: the stamina have four or eight filaments, shorter than the calyx, approaching by pairs, permanent: anthers small: the pistillum is a large germ, roundish: style very short: stigma simple, blunt: the pericarpium is a globular berry, placed on the green reflex calyx, one-celled, with a point curved in: the seed one, roundish, lens-shaped, rugged.

The species cultivated are: 1. *R. humilis*, Downy Rivina; 2. *R. lavis*, Smooth Rivina; 3. *R. octandra*, Climbing Rivina.

The first grows taller than the second, and the branches are more erect: the leaves are smaller, heart-shaped, and covered with short hairy down: the spikes of flowers are not so long; the flowers are not so closely placed together, and have longer peduncles. It is a native of the West Indies.

The second species rises with shrubby stalks six or eight feet high, dividing into several spreading branches, and covered with a gray spotted bark: the leaves alternate, lanceolate, entire, two inches and a half long and one inch

broad in the middle, drawing to a point at each end, smooth, of a lucid green, and pretty thick consistence, on long slender footstalks, and placed at pretty great distances on the branches: the flowers in long bunches, from the side and at the end of the branches, each on a slender peduncle near half an inch long: calyx scarlet: stamens eight, longer than the calyx: berry roundish, with a thin pulp, outwardly scarlet changing to purple; inclosing one roundish hard seed. It resembles the preceding very much, but is wholly smooth; but the leaves are purplish about the edge, and the flowers red on the outside. It is a native of the West Indies, flowering most part of the year.

The third rises with a climbing woody stalk to the height of twenty feet, covered with a dark gray bark: the leaves are oval-lanceolate, near three inches long, and an inch and half broad, smooth, entire, on short footstalks: the flowers come out in long bunches from the side of the branches, shaped like those of the second sort. The berries are blue, of the same size with those of the other. It is a native of the West Indies.

Culture.—These plants may be increased by seeds procured from the places where they are natives, sowing them as soon as they are obtained, in pots filled with fresh light earth, plunging them in a hot-bed when in summer, but in the tan-bed of the stove in the autumn or winter. The earth should be well moistened during the summer season, but very sparingly in the winter. They should be carefully preserved in these situations till the seeds vegetate, which is often a great length of time, of course the pots should not be disturbed.

When the plants have attained about two inches in growth, they may be removed into separate small pots, filled with light loamy mould, plunging them into a hot-bed, shading them till fresh rooted.

They afterwards require the management of other stove exotic plants.

They may likewise sometimes be raised by layers and cuttings, assisted by the heat of the bark hot-bed.

After these plants have been preserved in the stove of the hot-house till they have attained a good growth and strength, they are capable of being preserved in moderate warmth in winter, and in the warmest part of summer in the open air, in a warm sheltered place.

They afford variety among other potted ever-green stove plants.

ROBINIA, a genus comprising plants of the hardy deciduous tree and shrub sorts, with tender kinds for the stove.

It belongs to the class and order *Diadelphix Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianth, small, bell-shaped, four-cleft: the three lower toothlets more slender; the upper fourth toothlet wider, scarcely emarginate to the naked eye, all equal in length: the corolla papilionaceous: standard roundish, larger, spreading, blunt: wings oblong, ovate, free, with a very short blunt appendix; keel almost semiorbicular, compressed, blunt, the length of the wings: the stamina have diadelphous filaments, (simple and nine-cleft) ascending at top: anthers roundish: the pistillum is a cylindrical, oblong germ: style filiform, bent upwards: stigma villose in front at the top of the style: the pericarpium is a legume large, compressed, gibbous, long: the seeds few, kidney-form.

The species cultivated are: 1. *R. Pseud-Acacia*, False or Common Acacia; 2. *R. hispida*, Rose Acacia, or Robinia; 3. *R. Caragana*, Siberian Abrupt-leaved Robinia; 4. *R. frutescens*, Shrubby Robinia; 5. *R. pygmaea*, Dwarf Robinia; 6. *R. spinosa*, Thorny Robinia; 7. *R. violacea*, Ash-leaved Robinia; 8. *R. mitis*, Smooth Indian Robinia.

It grows very fast whilst young, so that in a few years from seed, the plants rise to eight or ten feet high, and it is not uncommon to see shoots of this tree six or eight feet long in one summer: the branches are armed with strong crooked thorns: the leaflets eight or ten pairs, ovate, bright green, entire, sessile: the flowers come out from the side of the branches in pretty long bunches, hanging down like those of *Laburnum*: each flower on a slender pedicel, white, and smelling very sweet: they appear in June, and when the trees are full of flowers, make a fine appearance and perfume the air round them; but they seldom continue more than a week. It is a native of North America, where it grows to a very large size, and the wood is much valued for its duration.

There is a variety which has no thorns on the branches, but which is easily known at first sight by its peculiar appearance.

And the Echinated, or Prickly-podded American False Acacia, in which the pods are much shorter, and closely beset with short prickles, but in other respects agrees with the common sort.

The second species rises in its native situation sometimes to the height of twenty feet, but in this climate seems to be of low growth; the branches spread out near the ground, and produce their flowers very young: the young branches, and also the peduncles and calyxes are

closely armed with small brown prickles, or rather stiff bristly hairs, like raspberries and some sorts of roses; the leaves are like those of the first sort, but the leaflets are larger and rounder; the flowers are larger, and of a deep rose colour, but they have no scent: they come out early in June, and make a fine appearance; each flower is on a short separate pedicel: the legumes flat oblong. It is a native of Carolina.

The third has arboreous trunks, commonly branched from the bottom, slender, with a smooth, shining, coriaceous bark, covered by a greenish ash-coloured skin: branches alternate, very much divided; twigs rod-like, weak, very leafy, ash-coloured or greenish, with longitudinal nerves running from bud to bud: buds alternate, frequent, bearing both leaves and flowers, unarmed, with the stipules of the bud-leaves soft, but in the new branches spinescent, divaricating, rigid. It is a native of Siberia, flowering in April and May.

The fourth species has a branched trunk from the bottom, with a dusky or greenish-ash-coloured bark; there are commonly many lateral shoots or suckers from the root: the branches rod-like, pliant, loaded with leaves and flowers, of a shining yellowish colour, with longitudinal gray nerves, with triple spines: the leaves on the shoots of the year alternate, with spinescent stipules; from the buds in bundles, with unarmed stipules: the leaflets clustered, obovate, attenuated at the base, with a spinule at the end: petiole spinescent, after the leaves are fallen, hardening with the stipules into a triple spine: the peduncles on the branches of the preceding year from each bud, one, two, or three, bent a little at the joint, one-flowered. It is a native of Siberia, by the Volga, &c.

The fifth has trunks covered with a shining yellowish bark: wood of a very deep bay, almost as hard as horn: the older twigs round, with a beautifully golden shining cuticle; branchlets gray, with very frequent two-spined buds: the spinules slender like needles, spreading, arising from the stipules, in the older branches deciduous: the leaflets four or six in the spontaneous shrub clustered in bundles, quite sessile, linear acuminate, a little hispid: the peduncles springing singly from most of the buds on the branchlets among the leaves, the length of the leaflets, bent at the joint. In this climate it is a low shrub, seldom rising more than three feet. The flowers are yellow, and appear in April. It is a native of Siberia.

The sixth species resembles the third sort, but is distinguished by its stiff or thorny stipules: it is a shrub above the height of a man: the leaflets six or eight, ovate, even; common petiole

VOL. II.

woody, the whole of it perennial, thorny at the end: the stipules awl-shaped, thorny, perennial: the trunk is scarcely an inch and half in diameter, with branches often a fathom in length, subdivided, twisted and diffused, so as to form a hemispherical head, full of branches and thorns. Being covered with flowers during the whole summer, it appears very beautiful: the wood bay-coloured within, on the outside yellow, and very hard: the cuticle on the younger branches greenish yellow, less shining, and more strigose than in the fifth sort, with ash-coloured longitudinal nerves, running from branch to branch: the branches are round, divaricating, alternate: the thorns spreading out every way almost at right angles, alternate, very large, arising from the permanent petioles enlarged, marked also with the scars of the leaflets, and having at the base on each side a small, bristle-shaped spinule, standing up, and arising from the stipules: there are several leaves and two or three flowers from the axils of all the spines on the branches: the petioles are spinescent: the leaflets commonly two pairs, but sometimes three and even four, linear-lanceolate, mucronate at the end with a spinule, opposite and remote: the peduncles are so short that the flowers seem to be sessile. It is a native of Siberia.

On account of the length and toughness of the branches, and its large stout thorns, it is admirably adapted to form impenetrable hedges, and is sufficiently hardy to bear our climate.

The seventh is an upright tree without thorns, growing to the height of twelve feet: the leaves alternate, numerous, shining; having three leaflets on each side, sometimes two, very seldom five; these are ovate, blunt, emarginate, entire, petioled, opposite, two inches long: the racemes axillary, half a foot in length; pedicels short, two-flowered, numerous: the flowers have the smell and colour of violets. It is a native of Carthage.

The eighth species has a shrubby stem, three feet high, upright, branched: the leaflets ovate-lanceolate, smooth, bright green, two- or three-paired: the racemes terminating, short: the corolla yellow: the legume oblong, narrowing to each end, smooth: the branches round, unarmed: the leaflets five, ovate, smooth, quite entire: the racemes have three flowers fixed at each tooth, each on its proper pedicel: the calyx subtruncate. It is a native of the East Indies, &c.

Culture.—The first six hardy sorts are all capable of being raised from seeds, cuttings, layers, and suckers; but the seed method is said to afford the best plants.

The seeds should be sown about the end of March or beginning of the following month, on a bed of light mould, being covered to the depth of about half an inch. In the first sort and varieties the plants mostly appear in the course of six or eight weeks; but in the other kinds often not till the next spring. They should be well weeded and watered, and when sufficiently strong be set out in the spring or autumn in nursery-rows, for two or three years, in order to remain to have proper growth for final planting out.

The cuttings should be made from the young shoots, and planted out in the beginning of autumn, in a shady border where the soil is mellow. They are mostly well rooted in the course of a twelvemonth, when they may be removed into nursery-rows as above.

The layers should be made from the young wood, being laid down in the autumn, when in the course of the year they mostly become well rooted, and may be taken off and planted out in nursery-rows as the seedling plants.

The suckers, which are produced in plenty from the two first sorts, which may be removed in the early autumn or spring, and planted out in nursery-rows or in beds, to be afterwards removed into them.

The two last, or tender sorts, may likewise be raised from seeds and cuttings, but they must be sown and planted in pots, filled with good mould, to have the assistance of a hot-bed in the stove, by being plunged in it. When the plants have attained a little growth, they should be shaken out of the pots, and planted separately in small pots, filled with the same sort of earth, plunging them in the tan-bed, affording due shade till well rooted, managing them afterwards as other tender stove plants.

The plants are most tender while young; they should therefore be kept in the stove tan-bed till they have acquired strength, when they may be preserved in the dry stove, with a temperate heat in winter, and be exposed in the open air in summer, in a warm sheltered situation when the weather is fine.

The hardy sorts have a fine effect in the border clumps and other parts of pleasure-grounds, and the tender kinds afford variety in the stove collections.

ROBINSON CRUSOE'S COAT. See **Cactus**.

ROCANBOLE. See **ALLIUM**.

ROCK-ROSE. See **Cistus**.

RONDELETIA, a genus containing plants of the woody exotic stove kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rubiaceae*.

The characters are: that the calyx is a one-leaved perianth, superior, five-parted, acute, permanent: the corolla one-petalled, funnel-shaped: tube cylindrical, longer than the calyx, bellying a little at top: border five-parted, from reflex flat; segments roundish: the stamina have five awl-shaped filaments, almost the length of the corolla: anthers simple; the pistillum is a roundish, inferior germ: style filiform, the length of the corolla: stigma bifid: the pericarpium is a roundish capsule, crowned, two-celled: the seeds several, or sometimes solitary.

The species chiefly cultivated is *R. Americana*, American *Rondeletia*.

It rises with a woody stalk ten or twelve feet high, branching out on every side; the branches covered with a smooth greenish bark: the leaves are oblong, ending in acute points, entire, the upper surface lucid green, the under pale; they are a little crumpled, and stand alternate: the flowers come out in bunches at the end of the branches, are white, and have little scent. They appear in autumn, but are not followed by seeds in this climate.

Culture.—This plant may be increased by sowing the seeds on a moderate hot-bed in the early spring, and when the plants have attained a little growth they should be removed into separate pots, being plunged in the bark-bed of the stove, where they are to remain and be managed as other tender exotic plants of a similar kind.

They afford variety in stove collections.

ROSA, a genus containing plants of the deciduous flowering shrub and evergreen kind.

It belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order of *Sciticeae*.

The characters are: that the calyx is a one-leaved perianth: tube ventricose, contracted at the neck; with the border spreading five-parted, globular: segments long, lanceolate-narrow (in some of them two alternate ones appendicled on both sides; two others, also alternate, naked on both sides; the fifth appendicled on one side only): the corolla has five petals, obcordate, the length of the calyx, inserted into the neck of the calyx: the stamina have very many filaments, capillary, very short, inserted into the neck of the calyx: anthers three-cornered: the pistillum has numerous germs, in the bottom of the calyx: styles as many, villose, very short, compressed close by the neck of the calyx, inserted into the side of the germ: stigmas blunt: there is no pericarpium: is a fleshy berry, turbinate, coloured, soft, one-celled, crowned with the rude segments, contracted at the neck,

formed from the tube of the calyx: the seeds numerous, oblong, hispid, fastened, to the inner side of the calyx.

The species cultivated are: 1. *R. lutea*, Single Yellow Rose; 2. *R. sulphurea*, Double Yellow Rose; 3. *R. flanda*, Hudson's-Bay Rose; 4. *R. cinnamomea*, Cinnamon Rose; 5. *R. arvensis*, White Dog Rose; 6. *R. pimpinellifolia*, Small Burnet-leaved Rose; 7. *R. spinosissima*, Scotch Rose; 8. *R. parviflora*, Small-flowered American Rose; 9. *R. lucida*, Shining-leaved American Rose; 10. *R. Carolina*, Carolina Rose; 11. *R. villosa*, Apple Rose; 12. *R. provincialis*, Provence Rose; 13. *R. centifolia*, Hundred-leaved Rose; 14. *R. Gallica*, Red Rose; 15. *R. damascena*, Damask Rose; 16. *R. sempervirens*, Evergreen Rose; 17. *R. pumila*, Dwarf Austrian Rose; 18. *R. turbinata*, Frankfort Rose; 19. *R. rubiginosa*, Sweet Briar Rose; 20. *R. muscosa*, Moss Provence Rose; 21. *R. moschata*, Musk Rose; 22. *R. alpina*, Alpine Rose; 23. *R. semperflorens*, Deep-red China Rose; 24. *R. alba*, White Rose.

The first has weak stalks, which send out many slender branches closely armed with short crooked brown prickles: the leaflets two or three pairs, ovate and thin, smooth, of a light green, sharply serrate: the flowers on short peduncles, single, bright yellow, without scent. It is a native of Germany, &c.

There is a variety termed the *Austrian Rose*, which has the stalks, branches and leaves like those of the Single Yellow Rose, but the leaves are rounder. The flowers are also larger; the petals have deep indentures at their points; are of a pale yellow on the outside, and of a reddish copper colour, orange-scarlet, or Barré colour within; are single, have no scent, or a disagreeable one, and soon fall away. It has sometimes flowers entirely yellow on one branch, and copper-coloured on another.

The second species differs from the preceding, not only in the doubleness of the flowers, but in having the leaflets simply serrate, not glandular, pubescent and glaucous underneath; whereas in that they are doubly serrate, glandular and glutinous, and of a shining green colour, the stipules lacerated; the fruits hemispherical and glandular, which in the other are subglobular and smooth: the prickles on the stem are of two sorts in this; a few being larger, and many smaller. It is a native of the Levant, flowering later than that, as in July.

The third has the stems, when full grown, unarmed; the younger ones, or those of the first year, are armed with slender straight prickles bent a little back at the top: branches round, unarmed, shining, reddish: the leaflets

commonly seven, oblong, sharply and almost equally serrate, smooth: the petioles smooth, generally armed with one or two spinules. It is a native of Newfoundland and Hudson's Bay, flowering from May to August.

The fourth species rises about four feet high: the branches are covered with a purplish smooth bark, and have no spines, except at the joints immediately under the leaves, where they are commonly placed by pairs; they are short and crooked: the leaflets seven, ovate, serrate, hairy on their under side: the leaves of the calyx narrow and entire: the flower small, with a scent like cinnamon, whence its name. But, according to Parkinson, the shoots are somewhat red, yet not so red as the double kind, armed with great thorns, almost like the Eglantine bush; thereby showing, as well by the multiplicity of its shoots as the quickness and height of its shooting, its wild nature: the roses are single, somewhat large, and of a pale red colour. It is a native of the South of Europe.

There is a double variety, in which the shoots are redder; the flowers small, short, thick, and double, of a pale red colour at the end of the leaves (petals), somewhat redder and brighter towards the middle. It is the smallest and earliest of the double garden roses, flowering in May.

The fifth has round, glaucous, often mahogany-coloured stems; with very long, thong-like branches, bowing, with scattered, hooked prickles, smaller than in the common Dog-Rose: the leaflets five or seven, but mostly five, ovate, pointed, smooth, simply serrate, glaucous underneath: the petioles prickly: peduncles three or five in a terminating cyme, (rarely solitary) mahogany-coloured, covered with a glandular roughness, not all exactly from one point, accompanied by a few lanceolate bractes, and each bearing a single white flower, like the common Dog-Rose, but never red or blush-coloured, and less fragrant: fruit oblong; but in ripening it becomes globose, and deep red: the styles, as soon as they have passed through the neck of the calyx, are compacted into a cylinder, resembling a single style, terminated by a knob composed of the stigmas, which distinguishes it from the other species. It is a native of England, &c.

The sixth species has been confounded with what is commonly called the Scotch Rose; and some think it is not distinct from that. In the garden plant, according to Pallas, there are larger and setaceous prickles intermixed, and nine leaflets, the lower ones smaller. The flowers are white, and the segments of the calyx entire.

And the Siberian shrub is very elegant, a foot and half or at most two feet in height; the trunk thorny all over, the thickness of the little finger, very much branched, the branches collected into an ovate form: the spines on the trunk and branches very frequent, bristle-shaped, transverse or reclining, gray: the leaves very small, on red petioles, sometimes smooth, sometimes with small prickles on them: the stipules very narrow with wider earlets, external and serrate: the leaflets commonly seven, but sometimes nine or five, the size of the little finger nail, oval, cut round, sharply double-serrate, stiffish, rugged, more or less retuse, on some shrubs rather acute: the peduncles sometimes rough, sometimes smooth, with a ternate and simple leaf, almost to the flower: the fruit globose, smooth, and when ripe black, dry and insipid, being crowned with the segments of the calyx. It is a native of the South of Europe, as well as Asia, flowering here in May and June.

The seventh has its stems about two feet high, upright, much branched, with numerous straight, unequal, very slender needle-like prickles, on the young branches, which often disappear from the old ones: the leaflets seven or nine, small, roundish, blunt, serrate, smooth, sessile: their common petiole is sometimes prickly: the peduncles solitary, one-flowered, smooth, or very seldom prickly: the stipules small, half-belt-shaped, toothed: the tube of the calyx almost hemispherical, smooth: the segments are entire: the petals white or cream-coloured, yellow at the base, delicately fragrant, sometimes striped with red: the fruit globose, deep red, black when quite ripe, smooth, but sometimes somewhat prickly. It is a native of most parts of Europe.

There are several varieties, as the Striped-flowered, or with variegated flowers, red striped with white.

The Red Scotch Rose, which seldom rises more than a foot high: the stalks are covered with a brown bark, and are closely armed with small spines; the leaves are very small; the flowers are also small, sessile, and of a livid red colour: the fruit is round, of a deep purple colour inclining to black when ripe.

And, according to Withering, there is also a variety with prickly peduncles, and cream-coloured flowers, changing to white.

Lawrence likewise mentions a double Scotch Rose.

The eighth species very much resembles the two following sorts; but differs in having the stem two feet high, the petioles hairy at the top, and the flowers in pairs. It rises with several slender stems to the height of two or three feet,

covered with a brownish-green bark, and armed with a few sharp spines: the leaflets are seven or nine, oblong-ovate and sharply serrate: the leaves of the flower-cup have often linear leafy elongations: the corolla is single and of a pale reddish colour.

There is a variety with a double flower.

The ninth rises with several smooth stalks to the height of five or six feet: the young branches are covered with a smooth purple bark: the leaves are composed of four or five pairs of spear-shaped leaflets, smooth on both sides, of a lucid green on the upper surface, but pale on the under, and deeply serrate: the segments of the calyx long, narrow and entire: the flowers of a livid red colour, single, with little scent, appearing in July.

The tenth species has the stem five or six feet high, smooth: the stipular prickles two: the leaflets seven, oblong-ovate or nearly lanceolate, smooth, not shining, but opaque, serrate, paler underneath: the petioles prickly: the peduncles several, branched, forming a corymb, unarmed, with glandular hairs scattered over them: the leaflets of the calyx undivided, hispid on the outside: the petals obcordate, red. It is a sort that flowers late; and, like the two preceding, a native of North America.

The eleventh grows upright to the height of four feet or more: the branches are upright and short: the prickles on the stem and branches scattered, small, awl shaped, nearly straight: the leaflets seven, elliptical, bluntish, clothed on both sides with short velvet-like down, fragrant when rubbed, their serratures fringed with glands: the petioles downy, prickly, glandular: the peduncles terminating, mostly solitary, one-flowered, rough with rigid glandular bristles: the germ globular, bristly: the segments of the calyx long, downy, prickly on the outside: the corolla of a full rose-colour, not very odoriferous: the fruit globular, larger than in any other sort, and for the most part bristly and blood-red. It is found in Europe and Asia, and known as a cultivated sort in plantations, &c., both in a single and double state.

The fruit has a pleasant acid pulp surrounding the seeds, and is sometimes made into a conserve or sweetmeat, and served up at table in desserts, &c.

The twelfth species is well known in gardens, and one of the most beautiful sorts: the flowers are sometimes very large, and the petals closely folded over each other, like cabbages, whence it is called the Cabbage Rose: the flowers have the most fragrant odour of all the sorts.

According to Parkinson, the Great Double

Damask Provence, or Holland Rose, has its bark of a reddish or brown colour: the leaves likewise more reddish than in others, and somewhat larger. It usually grows very like the Damask Rose, and much to the same height: the flowers are of the same deep blush colour, or rather somewhat deeper, but much thicker, broader, and more double by three parts almost, the outer leaves turning back, when the flower hath stood long blown, the middle part itself being folded hard with small leaves: the scent comes nearest the Damask Rose, but is much short of it.

There are several varieties, as the **Red Provence Rose**: the stem and branches are not so great as those of the other, but greener, the bark not being so red: the flowers are not so large, thick and double, but of a little deeper damask or blush colour, turning to red, but not coming near the full colour of the best Red Rose: nor is the scent so sweet as that of the Damask Provence, but coming near that of the ordinary Red Rose. It is not so plentiful in bearing as the Damask Provence.

The **Blush Provence Rose**, in which the stalks rise from three to four feet high, and are unarmed: the leaves are hairy on their under side: the peduncles have some small spines: the segments of the calyx are semi-pinnate: the corolla has five or six rows of petals, which are large, and spread open; they are of a pale blush colour, and have a musky scent.

The **White Provence Rose**, which differs only in the colour of the flowers.

The **Great and Small Dwarf Provence Roses**, called *Rose de Meaux*, differ from each other in little except size: the smaller of the two is generally known by nursery-men and gardeners by the name of *Pomponne Rose*. It throws out numerous stems, which rarely exceed a foot or a foot and half in height; usually straight, rigid, and very prickly: the flowers very small, and distinguished by the brilliant colour of the central petals, appearing in June.

All the sorts flower from July to August.

The thirteenth rises with prickly stalks about three feet high: the leaves have three or five leaflets, which are large, oval, smooth, and of a dark green with purple edges: the peduncles are set with brown bristly hairs: the segments of the calyx are smooth and semipinnate: the flowers are very double, and of a deep red colour, but have little scent. It is a native of China.

The varieties are very numerous; as the **Dutch Hundred-leaved Rose**; the **Blush Hundred-leaved Rose**; the **Singleton's Hundred-leaved Rose**.

The **Single and Double Velvet Rose**, which, according to Parkinson, has the old stem covered with a dark-coloured bark, but the young shoots of a sad green, with few or no thorns: the leaves are of a sadder green than in most roses, and very often seven on a stalk: the flower is single; or double with two rows of petals, the outer larger, of a deep red like crimson velvet; or more double, with sixteen petals or more in a flower, most of them equal: they have all less scent than the ordinary red Rose.

The **Burgundy Rose**, which is an elegant little plant, not more than a foot or eighteen inches in height.

The **Sultan Rose**; the **Stepney Rose**; the **Gurnet Rose**; the **Bishop Rose**; and the **Lisbon Rose**.

The fourteenth species has the stalks growing erect, and scarce any spines; they rise from three to four feet high: the leaves are composed of three or five large oval leaflets, which are hairy on their under side: the leaves of the calyx are undivided: the flowers are large, but not very double, spread open wide, and decay soon; they are of a deep red colour, and have an agreeable scent. "Parkinson gives the Red Rose the epithet of English, as this and the White are the most antient and known Roses to the country, and assumed by our precedent kings of all others, to be cognizances of their dignity, and because the Red is more frequent and used in England than in other places. The flowers, he says, vary in colour; some are of an orient red or deep crimson colour, and very double, although never so double as the White; some again are paler, tending somewhat to a damask; and some are of so pale a red, as that they are rather the colour of the Canker Rose; yet all for the most part with larger leaves than the damask, and with many more yellow threads (stamens) in the middle: the scent is much better than in the White, but not comparable to the excellency of the Damask Rose; yet this, being well dried and kept, will hold both colour and scent longer than the Damask."

There are several varieties: as the **Red Official Rose**; the **Mundi Rose**, which has the flowers very elegantly striped or variegated with red and white; in other circumstances it so perfectly resembles the Red Rose, that there can be no doubt of its being a variety of that; indeed it frequently happens that a Red Rose or two appears on the same plant with the variegated flowers.

The **Childing Rose**, the **Marbled Rose**, and the **Double Virgin Rose**, which have great affinity with each other, according to Miller.

The fifteenth rises with prickly stalks eight or ten feet high, covered with a greenish bark, and armed with short prickles: the leaves are composed of five or seven oval leaflets, dark green above, but pale underneath; the borders frequently turn brown and are slightly serrate; the peduncles are set with prickly hairs; the calyxes are semipinnate and hairy; the corolla is of a soft pale red, and not very double, but has an agreeable odour; the hips are long and smooth. It is a native of the South of France, &c.

There are several varieties: as the Red Damask Rose, the Blush Damask Rose, which differ only in the shade of colour.

The York and Lancaster Rose, which agrees with the Damask in stalk, leaf, &c., differing only in the flower being variegated with white stripes. Mr. Hart's Rose has the white stripes more distinct: the flowers in these being less double than in several others, are frequently succeeded by fruit, and have ripe seeds, from which other varieties may be obtained. According to Parkinson, "sometimes one half of the petal is of a pale whitish colour, and the other half of a paler damask than common; or one petal is white or striped with white, and the other half bluish or striped with bluish; sometimes also all striped or spotted over, and at other times little or no stripes or marks, and the longer it remains blown open in the sun, the paler and the fewer stripes, marks or spots will be seen in it. The smell is of a sweet Damask Rose scent."

The Red Monthly Rose, the White Monthly Rose, which are so called from their continuing to blow in succession during the greater part of the summer; not that they blow in every month, as the name implies. They are in every respect like the Damask Rose; unless it be that they are more full of prickles than that.

The Blush Belgic Rose, which rises about three feet high, with prickly stalks: the leaves are composed of five or seven leaflets, which are oval, hairy on their under side, and slightly serrate: the peduncles and calyxes are hairy, and without prickles; the calyxes are large and semipinnate; the flowers very double, of a pale flesh colour, with little scent, generally in great quantities.

The Red Belgic Rose, which differs only in having the colour of the flower a deep red.

The Great Royal Rose, and the Imperial Blush Damask Rose.

The sixteenth species has slender stalks which trail upon the ground unless they are supported, and if trained up to a pole or the stem of a tree will rise twelve or fourteen feet high; they are armed with crooked reddish spines, and have

small leaves, with seven oval acute leaflets, of a lucid green, and serrate: the leaves continue on all the year: the flowers are small, single, white, and have a musky odour. In their natural place of growth they continue in succession great part of the year, but their time of flowering in this climate is June. It is a native of Germany.

The seventeenth has the branches with a great abundance of prickles, which fall off on the stems: the fruits are large and pear-shaped. It is a native of Austria and Italy.

The eighteenth species has the young shoots covered with a pale purplish bark, set with a number of small prickles like hairs: the older branches have but few thorns: the fruit is very large: the flower is thick and double as a red-rose, but so strong swelling in the bud, that many of them break before they can be full blown; and then they are of a pale red-rose colour, between a red and a damask, with a very thick broad hard umbone of short yellow threads in the middle: the segments of the calyx are quite entire: the smell is nearest a red rose.

The nineteenth has yellow hooked prickles on the stem, which is five or six feet high: the leaflets seven, very fragrant, elliptic or subovate, above smooth and wrinkled, underneath rust-coloured with resinous atoms or little dots: serratures glandular: the petioles also glandular and prickly: the peduncles muricate and in corymbs: the calyx glandular: the petals rose-coloured, white at the base: the fruit scarlet, muricate, but sometimes smooth, farinaceous, insipid.

The cultivated plant grows larger and more erect: the leaves are bigger and much sweeter than in the wild one, the rusty colour of them disappears, and the whole puts on a more vigorous appearance: the sweet scent is supposed to proceed from the gland. It is a native of most parts of Europe.

There are varieties with double flowers: as the Common Double Sweet Briar, the Mossy Double Sweet Briar, the Evergreen Double Sweet Briar, the Marbled Double Sweet Briar, the Red Double Sweet Briar, the Royal Sweet Briar, and the Yellow Sweet Briar.

The twentieth species, which is mostly denominated the Moss Rose, from the moss-like pubescence on the calyx, has the stalks and branches closely armed with brown spines: the peduncles and calyx are covered with long hair-like moss: the flowers are of an elegant crimson colour, and have a most agreeable odour. It is known to us only in its double state, and the country to which we are indebted for it is not ascertained.

The twenty-first, or Musk Rose, rises with

weak stalks to the height of ten or twelve feet, covered with a smooth greenish bark, and armed with short strong spines: the leaflets seven, light-green and serrate: the flowers in large bunches, in form of umbels, at the end of the branches, are white, and have a fine, musky odour, appearing in July and August, and continuing in succession till the frost stops them. The stalks are too weak to support themselves. There is a variety with double flowers.

The editor of Miller's Dictionary considers the Evergreen Musk Rose of Miller to be the same with this.

The twenty-second species is a low shrub, with reddish-brown stems, the lower half or thereabouts of which is covered with straight awl-shaped slender white not pungent prickles; the upper part is quite naked: the stipules ciliate-glandular at the edge: the petioles hispid, and glandular: the leaflets commonly seven, smooth on both sides, ovate, biserrate, ciliate, glandular: the peduncles naked, unarmed: flowers solitary, red, middle-sized. It is a native of the Alps, &c., flowering in June and July.

The twenty-third has a height seldom exceeding three feet: the flowers large in proportion to the plant, semidouble, with great richness of colour (dark red) uniting a most delightful fragrance, coming out in succession during the greater part of the year, only more sparingly in the winter months. The segments of the calyx leafy at the end, one larger than the rest: the germs and peduncles sometimes, but rarely, smooth. It is a native of China.

The twenty-fourth species in its wild state has ovate leaves, smooth and deep green above, paler and slightly hairy underneath, unequally serrate and blunt: the stem and petioles villose, prickly: the peduncles solitary, long, hispid: fruits ovate, smooth, but more frequently having a few slender prickles on them: calyxes smooth, green, half-pinnate. It is a native of Europe, China, &c.

According to Parkinson, there are two varieties of the White Garden Rose; one attaining sometimes the height of eight or ten feet, with a stock of a great bigness, the other seldom higher than a Damask Rose. Both have somewhat smaller and whiter-green leaves than in many other roses, five most usually on a stalk, and paler underneath; as also a whiter-green bark, armed with short prickles. The flowers in the one are whitish, with an eye of blush, especially towards the bottom, very double, and for the most part not opening so fully as the Red or Damask Rose. In the other more white, less double, and opening more. Some have only two or three rows of petals; and all have little or no smell.

Culture.—In all the sorts the increase may be effected by suckers, layers, or by budding upon stocks of other sorts of roses; but this last method is only practised for some peculiar sorts, which do not grow well upon their own stocks, and send forth suckers sparingly. Where more sorts than one are to be had upon the same plant, such sorts only should be budded upon the same stock as are nearly equal in their manner of growth, otherwise the strong one will draw all the nourishment from the weaker.

The suckers should be taken off in October, and planted out either in nursery-rows, or the places where they are to remain; as where they are permitted to stand upon the roots of the old plants more than one year, they grow woody, and do not form so good roots as if planted out the first year.

The best method to obtain good-rooted plants is to lay down the young branches in autumn, which will take good root by the autumn following; especially when watered in dry weather; when they may be taken off from the old plants, and be planted out where they are to remain. The seeds are sometimes sown in the autumn, to produce new varieties, in beds of light mellow earth, or in drills, especially for the Common Sweet Briar kinds, and for raising hedges of them.

Almost all the sorts delight in a rich moist soil and an open situation, in which they produce a greater quantity of flowers, and those much fairer, than when they are upon a dry soil, or in a shady situation. The pruning which they afterwards require is only to cut out their dead wood, and take off all the suckers, which should be done every autumn; and if there are any very luxuriant branches, which draw the nourishment from the other parts of the plant, they should be taken out, or shortened, to cause them to produce more branches, if there be occasion for them to supply a vacancy; but it is best to avoid crowding them with branches, which is as injurious to these plants as to fruit-trees; for, if the branches have not equal benefit from the sun and air, they will not produce their flowers so strong, or in so great plenty, as when they are more open, and better exposed to the sun, so as to have a more free circulation of air. As the Moss Provence Rose seldom sends out suckers, and does not strike very freely by layers, it is often increased by budding it upon stocks of the other sorts; but the plants are best when raised from layers.

The best sort for flowering early and late is the Monthly, next to which in flowering in the open air is the Cinnamon, which is immediately followed by the Damask Rose, then the Blush, York, and Lancaster; after which, the Provence,

Dutch Hundred-leaved, White, and most other sorts : and the latest sorts are the Virginia and Musk Roses, which, if planted in a shady situation, seldom flower until September ; and, if the autumn proves mild, continue often till the middle of October. And the plants of the two sorts of Musk Roses should be placed against a wall, pale, or other building, that their branches may be supported, otherwise they are so slender and weak as to trail upon the ground. These plants should not be pruned until spring, because their branches are somewhat tender ; so that when they are cut in winter, they often die after the knife ; these produce their flowers at the extremity of the same year's shoots in large bunches, so that their branches must not be shortened in the summer, lest the flowers should be cut off. The shrubs will grow to be ten or twelve feet high, and must not be checked in their growth, if intended to flower well. They are all highly ornamental plants, mostly for the shrubbery borders and clumps, being planted according to their habits of growth.

ROSE-BAY. See NERUM.

ROSE, CAMPION. See AGROSTEMMA.

ROSE, CHINA. See HINISCUS.

ROSE, GUELDER. See VIBURNUM.

ROSEMARY. See ROSMARINUS.

ROSE of JERICHO. See ANASTATICA.

ROSE, ROCK. See CISTUS.

ROSE, ROOT. See RHODIOLA.

ROSMARINUS, a genus containing plants of the hardy shrubby evergreen kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Verticillatæ*.

The characters are : that the calyx is a one-leaved perianth, tubular, compressed above : mouth upright, two-lipped : upper lip entire, lower bifid : the corolla unequal : tube longer than the calyx ; border ringent : upper lip two-parted, upright, shorter, acute, with the edges bent back : lower lip bent back, trifid ; the middle segment very large, concave, narrow at the base ; the lateral ones narrow, acute : the stamina have two awl-shaped filaments, simple with a tooth, inclined towards and longer than the upper lip. Anthers simple : the pistillum is a four-cleft germ : style of the same figure, situation and length with the stamens : stigma simple, acute : there is no pericarpium : calyx containing the seeds at the bottom : the seeds four, ovate.

The species are : 1. *R. officinalis*, Official Rosemary.

It has a strong woody fibrous root. The stem shrubby, covered with a rough gray bark, divided into many branches, and in gardens

rising frequently to the height of eight or ten feet ; but in its natural state much lower. The leaves numerous, sessile, linear, entire, blunt, contracted at the edges, dark green above, grayish or whitish underneath, with small glandular excavations, placed in whorls on the branches : the flowers from the axils of the leaves, from six to twelve together, large, pale blue, sometimes white with blue spots and dots. It is a native of the South of Europe, &c., flowering from January to May.

There are varieties with narrow leaves ; with broad leaves ; with silver-striped leaves, and with gold-striped leaves.

Culture.—In all the sorts it may be effected by planting slips or cuttings in the early spring months as from March to May ; as well as by layers, in performing the first methods of which, a quantity of young shoots should be cut or stripped off from about five or six to eight or ten inches long, stripping off the lower leaves, and then planting them in a border of light earth, in rows a foot asunder, giving a good watering and repeating it frequently till they are rooted, which they effect in a short time, in the same year, shoot at top, and become tolerable little plants by autumn ; when about the beginning or middle of September, or in spring following, they may be transplanted where they are designed to remain for growth.

The layers should be laid down in any of the convenient lower young branches, into the earth, in the spring, summer, or autumn, and they will be well rooted by autumn following, when they may be taken off and planted out where they are to remain for plants.

Almost all the varieties are moderately hardy evergreen plants, though the common green sorts are the most so ; the striped kinds being liable to suffer by hard frosts, if much exposed, or planted in wet ground, of course they as well as all the sorts should have a warm situation and dry soil : some of the variegated kinds should also be potted, in order to have shelter of a green-house in winter. They are most durable in dry poor soils.

They afford variety in the border, clumps, and other parts of gardens and shrubberies.

ROYENA, a genus containing plants of the shrubby evergreen exotic kind for the green-house.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Bicornes*.

The characters are. that the calyx is a one-leaved, pitcher-shaped, five-cleft, permanent perianth : the corolla one-petalled : tube the length of the calyx : border spreading, revolute, five-

parted; segments ovate: the stamina have ten very short filaments fastened to the corolla: anthers oblong, acute, twin, erect, the length of the tube: the pistillum is an ovate germ, ending in two styles, a little longer than the stamens: stigmas simple: the pericarpium is an ovate capsule, four-grooved, one-celled, four-valved: berry globular, fleshy, four-celled, covered by the permanent corolla: the seeds, four nuts, oblong, triangular, wrapped in an aril: seeds solitary, in all four or two, oblong or elliptic, subtriquetrous or plano-convex.

The species cultivated are: 1. *R. lucida*, Shining-leaved Royena, or African Bladder-nut; 2. *R. villosa*, Heart-leaved Royena, or African Bladder-nut; 3. *R. glabra*, Myrtle-leaved Royena, or African Bladder-nut; 4. *R. hirsuta*, Hairy-leaved Royena, or African Bladder-nut.

The first is in height eight or ten feet, putting out branches on every side: the leaves alternate, shining, continuing all the year: the flowers from the wings of the leaves along the branches, having little beauty: the fruit a berry covered with the permanent calyx, which is coriaceous, torn, and striated within, globular, smooth, red above, pale below, four-celled: the flesh or pulp firm, whitish, almost like that of the apple: the cells filled with a pulp clear like glass, and not invested with any proper membrane, two of them commonly abortive, compressed, crescent-shaped: the seeds solitary, and two or four in all. It is a native of the Cape, flowering in May and June.

The second species resembles the preceding; but the branches are villous: the leaves elliptic or oblong, cordate at the base, tomentose underneath, bluish on short villose petioles: the flowers axillary, nodding, solitary, on villose peduncles the length of the flowers: the bractes two, opposite, ovate acute, pubescent, larger than the calyx and immediately under it, deciduous.

The third rises with a shrubby stalk, five or six feet high, sending out many slender branches, covered with a purplish bark: leaves less than those of the Box-tree, entire, of a lucid green, and continuing all the year. The flowers come out from the wings of the leaves round the branches, and are white. Fruit roundish, purple, ripening in the winter. It flowers in September.

The fourth species rises with a strong woody stalk seven or eight feet high, covered with a gray bark, sending out many small branches alternately: the leaves about an inch long, and a quarter of an inch broad in the middle, covered with soft hairs: the flowers come out on short peduncles from the side of the branches; are of

a worn-out purple colour and small: they appear in July, but are not followed by seeds in this climate.

Culture.—These plants are often rather troublesome in raising, but their culture may be attempted by cuttings and layers. The cuttings should be made from the young shoots, and be planted in the early spring in small pots filled with a loamy earth, plunging them in a very moderate hot-bed, covering them carefully with hand glasses, refreshing them often with water in small proportions. When they have stricken roots and are begun to shoot, inure them gradually to the open air, and when they are well rooted remove them into separate small pots, managing them afterwards as other rather tender green-house plants, such as the Orange-tree, &c.

The layers may be made from the young bottom shoots, laying them carefully down by slitting them as for Carnations, watering them often in the warm season, but very moderately in the cold. When they are become well rooted, take them off and plant them in separate pots in the same manner as the cuttings, giving them the same sort of management afterwards.

The last sort often sends up suckers from the roots, and may sometimes be increased by planting in the same way as the cuttings.

They afford variety among other green-house plants.

RUBIA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Stellata*.

The characters are: that the calyx is a very small perianth, four-toothed, superior: the corolla one-petalled, bell-shaped, four-parted, without a tube: the stamina have four awl-shaped filaments, shorter than the corolla: anthers simple: the pistillum is a twin inferior germ: style filiform, bifid at top: stigmas capitate: the pericarpium-berries two, united, smooth: the seeds solitary, roundish, umbilicate.

The species mostly cultivated is *R. tinctorum*, Dyer's Madder.

It has a perennial root, and an annual stalk. The root is composed of many long, thick, succulent fibres, almost as large as a man's little finger; these are joined at the top in a head, like the roots of Asparagus, and strike very deep into the ground, being sometimes more than three feet in length. From the upper part (or head of the root) come out many side roots, which extend just under the surface of the ground to a great distance, whereby it propagates very fast; for these send up a great number of

shoots, which, if carefully taken off in the spring, soon after they are above ground, become so many plants. These roots are of a dark colour on their outside, somewhat transparent, and have a yellowish red pith in the middle, which is tough, and of a bitterish taste; from the root arise many large, four-cornered, jointed stalks, which in good land will grow five or six feet long, and, if supported, sometimes seven or eight; they are armed with short herbaceous prickles, and at each joint are placed five or six spear-shaped leaves, about three inches long, and near one broad in the middle, drawing to a point at each end; their upper surfaces are smooth, but their midribs on the under side are armed with rough herbaceous spines; the leaves sit close to the branches in whorls. From the joints of the stalk come out the branches, which sustain the flowers; they are placed by pairs opposite, each pair crossing the other; these have a few small leaves toward the bottom, which are by threes, and upward by pairs opposite; the branches are terminated by loose branching spikes of yellow flowers, which are cut into four segments resembling stars. They appear in June. It is a native of the South of Europe, the Levant, and Africa.

Madder is so essential to dyers and calico-printers, that these businesses cannot be carried on without it.

Culture.—They are increased by offsets or suckers, from the roots of the old plants in the spring, as April or the following month; which should be slipped off soon after they appear above ground, by opening the earth round the roots, and taking off the side suckers with as much root-part and fibres to each as possible, preserving the tops entire; which should be planted directly, in the manner directed below. The ground being well prepared by frequent deep ploughing, or trenching over, and the proper quantity of sets or suckers provided, they should with a dibble be planted in rows two feet asunder, and one distant in the row, putting each plant low enough in proportion to the length of its root, leaving most of the green top out of the ground, and closing the earth well about each set, as the work proceeds. Some set these plants in beds, three rows length-ways; at two feet distance, with wide alleys between bed and bed, in order for landing up the crowns of the roots two or three inches deep in winter.

They shoot up into stalks the same year in either mode, but the roots require two or three years' growth before they are large enough for use; during which period they should be kept clean from weeds all the summer by broad-hoeing, in dry weather; and in autumn, when the

stalks decay, cutting them down, and then slightly digging the ground between the rows, raising it somewhat ridge-ways along the rows of the plants, an inch or two thick over their crowns; or, if they are in beds, they may be landed up from the alleys to the same depth; the same culture being repeated till the autumn of the third year, when the roots will be fit for taking up for use. This is performed by trenching the ground the way of the rows, beginning at one end of it, and opening a two-feet-wide trench close along by the first row of plants, digging down to the depth of the roots to get them clean out to the bottom; then opening another trench close to the next row, turning the earth into the first; and so on, trench and trench, till the whole is taken up and removed.

These plants succeed best in a light rich deep soil: the roots are sometimes used fresh for dyeing, being prepared by washing and pounding; but commonly when designed for keeping, or to be sent to a distance, are dried in some covered airy shed; then all the mould being rubbed off, and the roots made sufficiently dry, are sold to those who manufacture them for use, if not performed by the cultivator: this consists in drying them in a kiln or some stove-house, &c. then thrashing them to beat off the outer skin, in order to separate it from the inner part of the root, as being of an inferior quality. The roots being then dried in a kiln about twenty-four hours, are removed to a mill or pounding-house, where they are pounded in a long hollow oaken block, with stampers kept in motion by the mill; and when thus reduced to powder, sifted and put up in casks.

The plants are sometimes employed for variety in the border or other open parts of gardens or pleasure-grounds.

RUBUS, a genus containing plants of the under-shrubby and herbaceous perennial kind.

It belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is a one-leaved, five-cleft, perianth: segments oblong, spreading, permanent: the corolla has five roundish petals, the length of the calyx, from upright spreading: the stamina have numerous filaments, shorter than the corolla, inserted into the calyx: anthers roundish, compressed: the pistillum has numerous germs: styles small, capillary, springing from the side of the germ: stigmas simple, permanent: the pericarpium is a berry compounded of roundish *acini*, collected into a convex head, concave below; each one-celled: the seeds solitary, oblong: the receptacle of the pericarps conical.

The species are: 1. *R. idæus*, Raspberry; 2. *R. occidentalis*, Virginian Raspberry; 3. *R. odoratus*, Flowering Raspberry; 4. *R. fruticosus*, Common Bramble; 5. *R. hispidus*, Bristly Bramble; 6. *R. cæsius*, Dewberry Bramble; 7. *R. arcticus*, Dwarf Crimson Bramble; 8. *R. Chamæmorus*, Mountain Bramble, or Cloud-berry.

The first has the stems suffruticose, biennial, upright, round, aculeate-hispid, or thick set with small prickles, two feet high; they produce fruit the second year, after which they lie down. The leaflets rhomb-ovate, acute, marked with lines, unequally serrate, white underneath. The petioles pubescent, prickly. The peduncles hispid. The flowers in panicles. The fruit red, grateful to the smell and taste, deciduous, bristly with the permanent styles placed upon a conical receptacle. It is a native of many parts of Europe, flowering in May and June.

The varieties are: the Red-fruited, the White-fruited, the Twice-bearing, of which the first crop ripens in July, and the second in October, those of the latter season having seldom much flavour; the Smooth Raspberry, and the large Antwerp. The sorts mostly cultivated, according to Mr. Forsyth, are: the Early White, the Double-bearing White, the Large Common White, the Large Red, the Large Red Antwerp, the Large White Antwerp, the Smooth Cane Double-bearing, and the Woodward's New Raspberry.

The second species rises with purplish stalks, a little higher than the common sort. The leaves are of a lucid green on their upper side, but hoary on their under; their foot-stalks are taper; the fruit is of a deep black when ripe, has little flavour, and ripens late in autumn. It is a native of North America, flowering in May and June. It varies with a red fruit, more acid and pleasant than the European Raspberry.

The third has a perennial creeping root. The stems many, from four to seven feet high, about the size of a man's little finger, covered with a smooth bark of a light brown colour, and branching out a little towards the top. The leaves six inches long and seven inches broad, cut into three, four, or five angular lobes, ending in acute points, serrate, having several veins arising from the midrib, running upwards, diverging towards the borders, deep green above, but light green and smooth beneath; on foot-stalks four inches long, coming out alternately. The flowers in loose terminating bunches, each on a long peduncle. Petals large, roundish, of a light purple colour. The fruit is rarely produced here; but in North America, its native country, it is like the common Raspberry, only

not so pleasant. It flowers from June to September.

The fourth species has very long, trailing, or rather arching, woody stems, of a purplish hue; tough, with the angles strongly marked, and the prickles hooked. The leaves quinate, or sometimes ternate; leaflets somewhat elliptical, doubly-serrate, acute, dark-green and shining above, white and downy beneath; but sometimes the under side is merely hairy and of a paler green. All the leaflets are petioled; and the petioles are prickly. The stipules bristle-shaped. The panicles many-flowered, subracemed, tomentose. The fruit of a dark violet colour, with a mawkish sweet taste, composed of very numerous acini or grains. There are several varieties; but that which is chiefly introduced as a garden shrub is the Double-flowered Bramble.

The fifth has the stems with long procumbent woody shoots like those of the vine; these together with the petioles have stiff bristles scattered over them. The leaflets gash-serrate, the middle one petioled. The peduncles also are hispid. It is a native of Canada, flowering in August.

The sixth species has the stems prostrate, round, rooting, pale green with a vivid glaucous tinge: though woody, they are only annual, or at most biennial. The leaflets gashed and serrate, downy (not hoary) beneath: the lateral leaflets sessile, generally lobed on the outside, of various forms. Stipules lanceolate. The petioles downy, prickly, obscurely channelled above. The flowers few together, in terminating, downy, somewhat prickly panicles. The fruit black, with a bright blue tinge or bloom, composed of few large grains. Its flavour is agreeably acid, without the faint taste of the fourth sort. It is a native of Europe, flowering in June and July.

The seventh has a creeping root, but no runners. The stems are from a hand to a span in height, upright, simple, angular. The leaves unequally serrate, commonly altogether smooth. The flowers solitary, peduncled, terminating, deep rose-coloured, with the petals sometimes jagged. The fruit purple, sweet and fragrant, very pleasant, and, according to Linnæus, almost as large as a mulberry. It is a native of the North of Europe.

The eighth species is a plant of an elegant appearance, with a creeping root, a simple stem, hardly a foot high, upright; mallow-like, but smooth and hardish leaves, petioled, cordate, five-lobed, plaited, wrinkled, unequally serrate. The flowers terminal, peduncled, white; male and female, the former with short abortive pistils, the latter with abortive stamens. The berries are of a tawny or dull orange colour, com-

posed of many acini, acid, mucilaginous and not unpleasant. It is a native of Sweden, &c.

Culture.—In the first sort and varieties it may be effected by suckers and layers. The plants should always have a portion of ground to themselves, being planted at the distance of about six feet from row to row, and four in the rows, with the exception of the Early White sort, which may be set out closer.

According to Mr. Forsyth, the ground should first be well trenched over and dunged; then, making choice of the strongest and finest plants that come out from the sides of the stools, where they have been standing for some years, or encouraging the strongest plants that come out betwixt the rows after digging, which should be done annually, they may be planted out as above. In digging the ground, it frequently happens that the roots are cut with the spade, which occasions a great number of small plants to come up; of these the strongest and finest should, he says, be selected, heeling up all the superfluous ones. But he prefers laying down some of the strongest outside shoots in the month of March; as by the following autumn they will make fine roots, and may be planted out in a quarter or piece of ground where they are intended to remain. These will not be so liable, he thinks, to throw out suckers as those which are produced from suckers. The fresh pieces of ground should always be planted in moist weather, as the roots are very delicate, and liable to be hurt when exposed to a dry air. If, however, they are planted in dry weather, he advises that care be taken to moisten the roots with water, and cover them well with wet litter, or leaves, during the time in which they are planting out. In performing the work a trench should be opened with a spade along the line where the suckers or layers are to be planted, cutting off all the small fibry roots with a knife, leaving only the stronger roots; putting them into the trench, and covering them with some earth; then watering them well, and throwing the remainder of the earth over them, letting them remain till you have finished planting the piece; then, where you first began to plant, beginning to tread the ground with the foot as hard as possible along each of the trenches, and in the same direction as planted; then with a spade levelling all the ground smooth, and running it over with a rake, taking off any stones and rubbish that may be left on the surface, so as to render it perfectly even.

The plants should be watered two or three times a week when the season is dry till they have taken root; and it will be necessary to stake the Antwerp, and other strong-growing sorts, with stout stakes, running a couple of small rails

at top to tie the branches to, which will prevent their being broken by the wind, or beaten down by the rain. The Early White and smaller sorts may be plaited together at top, tying them round with the small yellow willow, which will keep them together. Some of the Early Raspberries may, he says, be planted between the trees on a west aspect, to produce early fruit before those in the quarters come in. The Antwerps thrive exceedingly well against north walls or palings, and produces late crops. Such as are planted against walls or palings should be tacked to them, to keep them in their places.

It is advised that where any of the small red and white sorts are found they should be destroyed, planting the Large Red, the Smooth Cane Double-bearing, the Large Red and White Antwerps, the Large common White, the Double-bearing White, and Woodward's New Raspberry in their stead. In respect to the cutting or pruning of these plants, some, Mr. Forsyth says, prefer pruning them in autumn, a practice of which he by no means approves of. As they bear the fruit on the wood of the preceding year, they are, he thinks, very liable to be killed by the frost in severe winters; but, by deferring the pruning till the month of February, there will be a great choice of fine wood for bearing the following summer, being careful to root out or cut down all the wood that bore fruit the preceding year, which generally dies, selecting only from five to seven of the most vigorous and strong shoots from the last year's wood to bear fruit the ensuing season. These shoots may, he says, be pruned to the length of three or four feet, according to their strength, when they are of the Smooth Cane Double-bearing sort (which generally bears a second crop in autumn, and will in fine seasons continue bearing from June to November); but, if the Large Antwerp, the shoots should be left five or six feet long in these prunings.

In regard to the Early White, which never grows so strong as the above sorts, it should, he says, be shortened to two feet and a half, or three feet. These should be planted in rows about three feet distant from each other, and two feet from plant to plant in the rows; always remembering to keep them clear of suckers, and to cut out the dead or last year's wood, as above; making choice of the strongest shoots for bearing wood. Great care should, however, be taken not to cut off the little spurs on the sides, which bear the fruit in this kind.

Plants of this sort continue in bearing five or six years; by which time a fresh plantation should be in readiness to succeed them. The young plants often bear some fruit the first year,



Painted by Syd Edwards

London Published June 1 1865. by G. Kearsley Fleet Street.

Engraved by E. Sanfey

Rudbeckia purpurea
1 Purple Rudbeckia

Rosa lutea
2 Single yellow Rose.

and come into full bearing in the second after planting. If they be suffered to remain more than five or six years on the same ground, he says, they degenerate and bear small fruit. And much care should be taken not to leave above eight or ten of the strongest shoots, rubbing off or pulling up all the superfluous ones; and keeping the ground well hoed and cleared of weeds between the rows, as well as in other places.

In the other sorts the increase may be effected by suckers, layers, cuttings, and dividing the roots, and in the two last or herbaceous kinds by seed.

The suckers should be taken up in autumn, winter, or spring, with roots; and the strongest be planted at once into the shrubbery, and the others in nursery-rows for a year or two, or till wanted for planting.

The layers should be made from the shoots, which may be done almost any time, as they readily emit roots at every joint, and become fit to plant out in the autumn following.

The cuttings should be taken off from some of the younger shoots, and divided into lengths a foot long, and planted in a shady border, either in the spring or summer season.

The roots in any of the raspberry or herbaceous sorts, when increased into large bunches, may be divided or slipped into several distinct sets, and planted out separately.

The last two sorts may likewise be raised from seeds, which should be taken from the ripened fruit, and sown in a moist situation where the plants are to remain, keeping the young plants clean afterwards.

The first species and varieties are highly useful for their fruit; for the table, preserving, and other culinary purposes.

The other sorts afford variety in the borders, clumps, and other parts of pleasure-grounds, among other hardy plants.

RUDBECKIA, a genus containing plants of the herbaceous biennial and perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositae Oppositifoliae*.

The characters are: that the calyx is common with a double row of scales: scales flat, widish, curtailed, six in each row: the corolla compound radiate: corollets hermaphrodite, numerous, in a conical disk; females about twelve, very long in the ray: proper of the hermaphrodite, tubular-funnel-form, with a five-toothed border: female ligulate, lanceolate, with two or three teeth, flat, pendulous: the stamina in the hermaphrodites: filaments five, capillary, very short: anther cylindrical, tubular: the pistillum in the hermaphrodites: germ four-cornered: style filiform,

the length of the corollet: stigma two-parted, revolute: in the females: germ very small: style none: stigma none: there is no pericarpium: calyx unchanged: the seeds in the hermaphrodites solitary, oblong, crowned with a membranaceous four-toothed rim: in the females none: the receptacle chaffy, conical, longer than the common calyx: chaffs the length of the seeds, erect, channelled-concave, deciduous.

The species cultivated are: 1. *R. laciniata*, Broad Jagged-leaved Rudbeckia; 2. *R. digitata*, Narrow Jagged-leaved Rudbeckia; 3. *R. hirta*, Hairy Rudbeckia; 4. *R. purpurea*, Purple Rudbeckia; 5. *R. angustifolia*, Narrow Simple-leaved Rudbeckia; 6. *R. triloba*, Three-lobed Rudbeckia.

The first is by some divided into two species, which are thus described: the root of the former is perennial, but the stalk is annual: the lower leaves are composed of five broad lobes, deeply cut into acute points, and some of them jagged almost to the midrib; the outer lobe is frequently cut into three deep segments: the stalks rise seven or eight feet high, and divide at top into several branches; are smooth, green, and have single, oval heart-shaped leaves, some indented on their edges, others entire: the peduncles naked, terminated by a single flower with yellow rays, like the sun-flower, but smaller: the latter is also perennial, and has smooth green stalks; but they rise higher: the leaves have all five lobes, which are much narrower, end with sharper points, and are very acutely indented on their sides: the flowers are smaller, and the petals narrower. They are both natives of North America, flowering here in July.

The second species has a perennial root like the former: the leaves at bottom are composed of seven or nine lobes, some entire, others jagged to the midrib; they are of a dark green and smooth: the stalks rise six feet high, and divide into many branches; they are of a purple or iron colour, and very smooth: the stem-leaves towards the bottom are hand-shaped, and composed of five lobes; higher up they have but three lobes, and at top the leaves are single: the flowers are smaller than those of the preceding, but of the same shape and colour. It is a native of North America, flowering in August and September.

In the third, the root continues four or five years: the leaves are oblong, ovate, and hairy: the stalks rise a foot and half high, and have one or two leaves near the bottom: the peduncle is naked near a foot in length, and is terminated by one pretty large yellow flower, shaped like the sun-flower: the florets of the ray are very

stiff, and slightly indented at their points: the disk is very prominent, and of a dark purple colour. The flowers will continue six weeks, and there is a succession of them from the middle of July, till the frost puts a stop to them. It is a native of Virginia.

The fourth species is a perennial plant like the third. The leaves are longer and broader, are smooth, and have three veins: the peduncles are taller, and have two or three narrow leaves on each, placed alternately: on the top is one flower, with long narrow, reflexed, peach-coloured florets in the ray: the disk is very prominent, and of a dark purple colour: it flowers at the same time with the third, but the flowers are of not so long duration. It is a native of Carolina and Virginia.

The fifth has the root perennial: the stalks four or five feet high: the leaves narrow, smooth, opposite: the florets in the ray of the flower yellow, long, twelve in number: disk dark red: the scales of the calyx spreading and almost awl-shaped. It is a native of Virginia, flowering in August and September.

The sixth species is biennial: the lower leaves are divided into three lobes, but those upon the stalks are undivided: they are hairy, and shaped like those of the first sort: the stalks branch out on their sides, and are better furnished with leaves than the others: the flowers are very like those of the first sort, but smaller. It grows naturally in several parts of North America.

Culture.—All the sorts of these plants may be increased by offsets, parting the roots and seeds.

The offsets in the perennial sorts should be taken off and planted out in the early autumn: when the stems decay the roots may also be divided and planted out at the same time, or in the early spring months.

As these plants are often liable to go off soon, some should be frequently raised to keep up the stock; and as others have a tendency to become biennial, and decay without increasing the root, they should have the flower-stems cut down in the early summer, to encourage the growth of the root offsets, for slipping in the following autumn.

All the sorts may be raised from seed, and the biennial sorts must always be raised annually in that way; likewise such of the perennial kind as are biennially inclined, sowing the seeds in April, in a border of light earth, raking them in; and when the plants are two or three inches high, pricking them out in nursery-rows till autumn, then planting them out where they are to remain. They should have a light dry soil and rather warm situation.

They afford much ornament and variety in

the borders and clumps, among other flowering plants.

RUE. See RUTA.

RUMEX, a genus containing plants of the herbaceous perennial and woody evergreen kinds.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Holoracea*.

The characters are: that the calyx is a three-leaved perianth: leaflets obtuse, reflex, permanent: the corolla has three ovate petals, bigger than the calyx, and like it, converging, permanent: the stamina have six capillary filaments, very short: anthers erect, twin: the pistillum is a turbinate-three-sided germ: styles three, capillary, reflexed, standing out between the clefts of the converging petals: stigmas large, lacinate: there is no pericarpium: corolla converging, three-sided, inclosing the seed: the seed single, three-sided.

The species cultivated are: 1. *R. acetosa*, Common Sorrel; 2. *R. scutatus*, French Sorrel; 3. *R. Patientia*, Patience Dock, or Rhubarb; 4. *R. sanguineus*, Bloody-veined Dock, or Bloodwort; 5. *R. Lunaria*, Tree Sorrel.

The first has a perennial root, running deep into the earth: the stem mostly simple, erect, round, deeply striated, leafy, from one to two feet high: the radical and lower stem-leaves on long foot-stalks, with a membranous cylindrical sheathing stipule embracing the stem and torn at the top; these leaves are arrow-shaped, blunt, entire or but little waved in their sides, but at the base cut into two or three large sharpish teeth pointing backwards, and not, as in some of the species, divaricated into a right angle with the outline of the leaf: the upper leaves sessile, gradually more entire, embracing, acute, a little rolled back; those at the top of the stem only slightly crisped at their base: a compound sort of whorled spike or branched panicle terminates the stem; its branches alternate and nearly erect: the barren flowers are on a separate plant from the fertile ones.

The whole herb is acid, with a degree of astringency, not unpleasant or unwholesome. It is often cultivated as a culinary herb.

There is a variety with broad leaves, termed Great Mountain Sorrel.

The second species has a hard, fibrous, perennial root: the stem from a foot to eighteen inches in height, very slightly angular, glaucous, smooth, dividing into alternate spreading branches: the leaves are cordate or hastate, glaucous, smooth, soft, fleshy, blunt, entire, an inch and half in length and breadth, on petioles two or three inches long, channelled within: the flowers in a sort of whorls, forming all together



Painted by J. Edwards

London Published May 1846 by G. Kearsley Fleet Street

Engraved by F. S. 1846

Sanguinaria Canadensis
1 Canada Puccoon.

Saxifraga crassifolia
2 Oval leaved Saxifrage.

Digitized by Google

• spike-shaped racemes, nodding and coming out three or four together on capillary pedicels from a white sheathlet: valves subcordate, large, bright rose-colour, entire, without any grains. It is a native of Germany, &c.

This, which is called Round-leaved Sorrel, is a more grateful acid than the first sort, and of course preferred for kitchen use, in soups, &c.

The third has a large root, dividing into many thick fibres, which run downwards; the bark is brown, but the inside is yellow, with some reddish veins: the leaves are broad, long, acute-pointed, on petioles of a reddish colour: the stems from four to six feet high, dividing towards the top into several erect branches, having a few narrow leaves on them, and terminated by spikes of large flowers, which appear in June. It is a native of Italy.

The fourth species has a fusiform root: the stem is upright, branched, angular, leafy, smooth; all the leaves petioled, smooth, veined, somewhat curled about the edge: the root-leaves very large, cordate at the base: racemes terminating, spreading, almost leafless; with the flowers in alternate bundles, pedicelled, nodding.

The fifth species rises with a woody stalk ten or twelve feet high, covered with a smooth brown bark, and sending out many branches: the leaves are smooth, roundish-heart-shaped, two inches long, and an inch and half broad, alternate upon pretty long footstalks: the flowers come out in loose panicles towards the end of the branches: are of an herbaceous colour, and sometimes succeeded by triangular seeds with smooth covers; but the seeds rarely ripen in this climate. It is a native of the Canary Islands.

Culture.—The first and second sorts and varieties may be increased by seed and parting the roots, but more particularly the first, as the latter may be very readily increased by the roots. The seeds should be sown in a bed or border in the early spring, as March, raking it in evenly. When the plants come up they should be regularly thinned, and when of some growth, in the summer, be planted out in rows on a bed or border, about eight or nine inches apart in the common sort, and in the other a foot or more, watering them well; when they will be proper to cut the latter end of the same summer and in the autumn, continuing for several years; but as the seedling plants in the first kind mostly produce larger leaves than the older plants, fresh supplies should be raised annually or every other year.

The parted roots may be planted out in the

same season, or in autumn, in rows a foot apart, giving them a good watering; when they grow readily, and furnish leaves in the latter end of summer and in the autumn.

The second sort is readily raised in this way. They afterwards only require to be kept clean, and to have the seed stems cut down in the summer, as well as the rank leaves in the autumn, that more full supplies of fresh leaves may be afforded.

The third and fourth sorts may be raised also from seeds in the same way, and the former from offsets of the root planted out in the autumnal season; when they grow very readily.

The last sort is easily increased by cuttings of the young shoots in the spring and summer months, being planted in pots at the former season, plunging them in a hot-bed; but in the latter they succeed without artificial heat, either in pots or the natural ground, being occasionally shaded and watered; when they become well rooted by the autumn.

The third and fourth sorts afford variety in the clumps and borders, and the last among the green-house collections.

RUSCUS, a genus containing plants of the shrubby and under-shrubby evergreen kind.

It belongs to the class and order *Dioecia Syngenesia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that in the male, the calyx is a six-leaved perianth, from erect-spreading; leaflets ovate, convex, with the lateral margin reflexed: the corolla has no petals, unless the alternate calyx-leaves be called so: nectary central, ovate, the size of the calyx, inflated, erect, coloured, perforated at the top: the stamina have no filaments: anthers three, spreading, placed on the top of the nectary itself, united at the base—female: the calyx is a perianth as in the male: the corolla petals as in the male: nectary as in the male: the pistillum is an oblong-ovate germ, concealed within the nectary: style cylindric, the length of the nectary: stigma obtuse, prominent beyond the mouth of the nectary: the pericarpium is a globular, three-celled berry: the seeds two, globular.

The species cultivated are: 1. *R. aculeatus*, Prickly Butcher's Broom; 2. *R. Hypophyllum*, Broad-leaved Butcher's Broom; 3. *R. Hypoglossum*, Double-leaved Butcher's Broom; 4. *R. racemosus*, Alexandrian Laurel; 5. *R. androgynus*, Climbing Butcher's Broom.

The first has the roots thick, white, twining about each other, putting out frequent fibres like those of the asparagus, oblique, striking deep in the ground: the stem suffruticose, tough, stiff,

green, round, striated, from eighteen inches to three feet in height, sending out from the sides many short branches; having many leaves on them, nearly of the same shape and size with those of myrtle, but very stiff, and ending in sharp prickly points: they are alternate, about half an inch long, and one-third of an inch broad near the base, ovate, quite entire, sessile: from the middle of the leaf above comes out a single flower, on a very short pedicel; it is small, and yellowish green or purplish; when it first appears, it is the size and shape of a small pin's head; when expanded, composed of three outer widish calyx-leaves, and three inner narrower like rays, ending in a narrow point. The female flowers are succeeded by berries, which are red, bigger than those of the asparagus, and almost as large as some cherries, of a sweetish taste; having two large orange-coloured seeds in each: the flowers come out in March and April. It is a native of the Southern parts of Europe.

The second species has the roots with large knotty heads, and long thick fibres like those of the preceding sort; from which arise many tough limber stalks near two feet high: the leaves stiff, ovate-oblong, ending in points, more than two inches long and almost one broad, placed alternately: the flowers are produced on the under surface of the leaves near the middle, sitting close to the midrib; are small and herbaceous: the female flowers are succeeded by small red berries about the size of those of juniper. It is a native of Italy, flowering in May.

The third has the root like the preceding: the stems about ten inches high: the leaves lanceolate, about three inches long, and one inch broad in the middle, drawing to a point at both ends, and having several longitudinal veins running from the footstalk to the point: they are mostly alternate, but sometimes opposite: on the middle of the upper surface comes forth a small leaf of the same shape; and at the same point, from the bosom of the small leaves, come out the flowers, which are of a pale yellow colour. The berries are almost as large as those of the first sort; are red, and ripen in winter. It is a native of Italy, &c. flowering in April and May.

The fourth species has roots like those of the other species: the stalks slender and much more pliable: they rise about four feet high, and send out many side branches: the leaves oblong, acute-pointed, about two inches long, and one-third of an inch broad, rounded at the base, smooth, of a lucid green, placed alternately, and sessile: the flowers are in long bunches at the end of the branches, of an herbaceous yellow colour: the berries like those of the first sort,

but smaller, ripening in winter. It is a native of Portugal.

The fifth species sends out pliant stalks which rise seven or eight feet high, and have several short branches proceeding from their sides: the leaves are stiff, about two inches long, and one inch broad towards their base, where they are rounded to the footstalk, but they end in acute points; many longitudinal veins run from the footstalk to the point: the flowers are produced in clusters on the edges of the leaves, and are white: the berries yellowish red, not so large as those of the first sort. It differs from the other sorts in having androgynous flowers divided into six equal segments to the bottom, but falling off in one piece, and arising from the edge, and not the disk of the leaf. It is a native of the Canary Islands, flowering most part of the summer.

Culture.—They are capable of being readily increased by the roots, which send up numerous stalks or suckers which may be taken up in autumn, winter, or spring in open weather, and divided into many separate sets each forming a proper plant, though they need not be divided very small unless where a great increase is required, planting the largest at once where they are to remain, and the smallest in nursery-rows, &c., when each plant soon increases by offsets, and assumes a bushy growth.

They are capable of being raised from seeds, but they often remain in the ground till the second spring. The seeds of the hardy sorts should be sown in any bed or border an inch deep, and the tender kind in pots, placed under shelter in cold weather; and when the plants are a year old, pricking them out in March, the hardy sorts in nursery-beds for two or three years, and the tender sorts in pots.

The different hardy sorts are proper for the verges of shrubberies, or any close plantations, as they thrive under the drip of trees, and remain green the year round.

But the last tender sort requires the shelter of a green-house in winter, where it affords variety among other potted plants.

RUSH, FLOWERING. See BUTOMUS.

RUSH, SWEET. See ACORUS.

UTA, a genus containing plants of the under-shrubby evergreen kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a five-parted perianth, short, permanent: the corolla has five petals, spreading subovate, concave; with narrow claws: the stamina have ten filaments, awl-shaped, spreading, the length of the

R U T

corolla, widish at the base: anthers erect, very short: the pistillum is a gibbous germ, inscribed with a cross, surrounded at the base by ten honey-dots, raised on a receptacle punctured with ten honey-pores: style erect, awl-shaped: stigma simple: the pericarpium is a gibbous capsule, five-lobed, half-five-cleft, five-celled, opening into five parts between the tips: the seeds very many, rugged reniform-angular.

The species cultivated are: 1. *R. graveolens*, Common Rue; 2. *R. montana*, Mountain Rue; 3. *R. chalepensis*, African Rue; 4. *R. patauna*, Three-leaved Rue.

The first has the root woody, branched: the stems frutescent, covered with a rugged, gray, striated bark, eighteen inches high and more: the branches, especially the young ones, smooth and pale green: the leaves glaucous, pulpy, dotted, divided like the umbellate plants, doubly pinnate, or more properly superdecompound: the leaflets obovate, sessile; the lower ones smallest; the end one commonly trifid, with the middle lobe much larger than the rest: the flowers in a branching corymb on subdivided peduncles. It is a native of the South of Europe; flowering from June to September.

The varieties are: the Common Broad-leaved Rue, the Narrow-leaved Rue, and the Variegated-leaved Rue.

The second species has the lower leaves composed of several parts, which are joined to the midrib in the same manner as other branching winged leaves, and have linear leaflets standing without order: the stalks are from two to three feet high, branching out from the bottom, and garnished with leaves divided into five parts, and those at the top into three, which are as small and narrow as the bottom leaves; are of a gray colour, but not so feid as those of the preceding: the flowers grow at the end of the branches in loose spikes, which are generally reflexed. It is a native of the South of Europe, and Barbary, flowering in August and September.

The third is very like the first, and is its off-

R U T

spring: the first flowers are five-cleft, and the others four-cleft, as in that: the stem is three feet high, upright, round, very much branched: the leaves superdecompound, oblong-ovate, smallish, cinereous, smooth, strong-smelling: the flowers in a terminating panicle. It is a native of Africa.

There are varieties with broad leaves and with narrow leaves.

In the fourth species the stalk rises singly from the root, is about a foot high, and herbaceous: the leaves alternate, narrow: the stalk branches at the top in form of an umbel, sustaining many yellow flowers, composed of five entire plane petals, having no hairs on their borders: it seems to be a plant of short duration. It was found in Italy.

Culture.—All the species and varieties may be readily increased by seed, slips, and cuttings. The seed should be sown in the open ground, in March or April, on a bed of light earth, raking it in: the plants soon come up, which when two or three inches high should be planted out in nursery-rows, and watered till fresh rooted. And from the scattered or self-sown seeds of the common sort, many young plants often rise in autumn and spring, which form good plants; but by slips or cuttings is the most expeditious method of raising all the sorts, as every slip or cutting of the young wood will readily grow. It is the only method by which the different varieties can be continued distinct. The slips or cuttings should be made from the young shoots six or eight inches long, and planted in a shady border, in rows half a foot asunder, giving a good watering, and repeating it occasionally; by which they will soon emit roots below and shoots at top, so as to form little bushy plants by the autumn following.

They all afford variety in the borders and other parts, and the first sort and varieties are useful medicinal plants. The third sort should have a dry soil and sheltered situation.

S A C

SABINA. See JUNIPERUS.
SACCHARUM, a genus containing a plant of the tender perennial reed kind.

It belongs to the class and order *Triandria Digynia*, and ranks in the natural order of *Gramina*.

VOL. II.

S A C

The characters are: that the calyx is a two-valved glume, one-flowered: valves oblong-lanceolate, acuminate, erect, concave, equal, awnless, surrounded with a long lanugo at the base: the corolla two-valved, shorter, sharpish, very tender: nectary two-leaved, very small: the sta-

s B

mina have three capillary filaments, the length of the corolla: anthers somewhat oblong: the pistillum is an oblong germ: styles two, feathered: stigmas plumose: there is no pericarpium: corolla invests the seed: the seed single, oblong.

The species cultivated is *S. officinarum*, Common Sugar-cane.

It has a jointed root, like that of other sorts of cane or reed: from this arise four, five, or more shoots, proportionable to the age or strength of the root, eight or ten feet high, according to the goodness of the ground: in some moist rich soils, canes have been measured near twenty feet long; but these are not near so good as those of middling growth; abounding in juice, but having little of the essential salt: the canes are jointed, and these joints are more or less distant, in proportion to the soil: a leaf is placed at each joint, and the base of it embraces the stalk to the next joint above its insertion, before it expands; hence to the point it is three or four feet in length, according to the vigour of the plant; there is a deep whitish furrow or hollowed midrib, which is broad and prominent, on the under side; the edges are thin, and armed with small sharp teeth, which are scarcely to be discerned by the naked eye, but will cut the skin of a tender hand, if it be drawn along it: the flowers are produced in panicles at the top of the stalks; are from two to three feet long, and composed of many spikes nine or ten inches in length, which are again subdivided into smaller spikes: these have long down inclosing the flowers, so as to hide them from sight: the seed is oblong-pointed, and ripens in the valves of the flower. It is a native of both the Indies, and the Islands of the South Seas.

There are three remarkable varieties mentioned by Loureiro, differing in the culm, not in the flower: the White Sugar-cane, with the culm long, white, of a middling size, very sweet, the knots distant; the Red Sugar-cane, with the culm short, thicker, red, very juicy, the knots approximate; the Elephantine Sugar-cane, with the culm very thick, red, long, less sweet, the knots approximate: and there are, probably, no others in a plant so much cultivated.

Culture.—This plant is capable of being increased by slips or suckers from the root, and by cuttings of the main stalks; but here generally by slips from the bottom; or any side-shoots arising from the stems near the root, having earth raised about the bottom part will soon emit fibres, and be fit for separation: the slips or offsets may be taken off at any season in which they appear fit for the purpose, being

careful to detach them with some fibres to each, and plant them separately in pots of rich earth, plunging them in the bark-bed, watering and occasionally shading them till they have got root, retaining them always in the bark-bed in the stove, treating them as other exotics of that sort.

They afford variety among other stove plants.

SAFFLOWER. See *CARTHAMUS*.

SAFFRON. See *CROCUS*.

SAGE. See *SALVIA*.

SAGE OF JERUSALEM. See *PHLOMIS*.

SAINT ANDREW'S CROSS. See *ASCYRUM*.

SAINT BARNABY'S THISTLE. See *CENTAUREA*.

SAINT JOHN'S BREAD. See *CERATONIA*.

SAINT JOHN'S WORT. See *HYPERICUM*.

SAINT PETER'S WORT. See *HYPERICUM*.

SALIX, a genus containing plants of the deciduous tree aquatic kind.

It belongs to the class and order *Dioecia Diandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that in the male the calyx is an ament oblong, imbricate every way, constructed of an involucre from the bud, consisting of scales one-flowered, oblong, flat, spreading: there is no corolla: petals none: nectary a gland cylindric, very small, truncate, melliferous, in the centre of the flower: the stamina have two straight, filiform filaments, longer than the calyx: anthers twin, four-celled—female: the calyx ament and scales as in the male: there is no corolla: the pistillum is an ovate germ, attenuated into a style scarcely distinct, a little longer than the scales of the calyx: stigmas two, bifid, erect: the pericarpium is an ovate-subulate capsule, one-celled, two-valved: valves revolute: the seeds numerous, ovate, very small, and crowned with a simple hirsute pappus or down.

The species cultivated are: 1. *S. triandra*, Long-leaved Three-stamened Willow; 2. *S. pentandra*, Bay-leaved Willow; 3. *S. vitellina*, Yellow Willow; 4. *S. amygdalina*, Broad-leaved Three-stamened Willow; 5. *S. hastata*, Halbert-leaved Willow; 6. *S. fragilis*, Crack Willow; 7. *S. Babylonica*, Weeping Willow; 8. *S. purpurea*, Bitter Purple Willow; 9. *S. Helix*, Rose Willow; 10. *S. fissa*, Basket Osier; 11. *S. rubra*, Green Osier; 12. *S. caprea*, Round-leaved Sallow; 13. *S. cinerea*, Cinereous-leaved Sallow; 14. *S. alba*, White Willow; 15. *S. viminalis*, Osier.

The first is naturally a tree thirty feet or more in height, but being one of the best osiers for the use of basket-makers is generally cut and

kept low: the bark of the stem and branches peels off spontaneously, almost like that of the plane-tree: the branches are upright, long, slender, pliable and tough, though somewhat brittle at their insertion; their bark is brownish and smooth: their leaves about three or four inches long, tapering away towards the base, and the breadth on each side the nerve is as nearly equal as possible; they terminate in a point; their margin is thickly serrate, the serratures incurved and rounded, a little glandular; both sides smooth, the under rather glaucous. Mr. Curtis remarks that it is not usual for willows to flower both in spring and autumn, but he has frequently found this species to do so. It is a native of many parts of Europe.

It may be admitted into ornamental plantations, the male catkins being very numerous, of a bright yellow colour, and of an agreeable scent: the male tree should on this account be preferred for ornament; and also because the females quickly shed their catkins and make a litter.

The second species is sufficiently well known by its broad odoriferous leaves, the serratures of which exude a copious yellow resin, and its numerous stamens, commonly about five to each flower. It frequently grows to a tree ten or twelve feet high, with a trunk as large as a man's thigh: the twigs are of a reddish colour tinged with yellow; the leaves are stiff, shining smooth on both sides, finely serrate with close numerous cartilaginous teeth; when full grown they are about three inches long, and an inch and half wide: their footstalks are short, broad, and sprinkled with glands: each scale in the male catkin has usually five stamens, but often six, and sometimes seven. These catkins are very sweet-scented. It is a native of Britain, &c.

The third is a middle-sized tree, much branched at the top: branches upright: the bark gray, chopped, cinnamon-coloured within, bitter and astringent: the female trees, when left to themselves, have pendent branches, but when lopped are stiff and straight: male catkins at first upright, then turned down; cylindrical, slender, serpentine, two inches long or more; on fruitstalks half an inch long: nectaries two: stamens two: female catkins from two to three inches in length, on fruitstalks from an inch to an inch and half long: the leaves alternate, upright, slightly serrate, with a yellowish midrib; they are about three inches long and one inch broad, but always broader in the female tree: the male tree is generally smaller and less common than the female. It is a native of the more temperate parts of Europe.

The shoots are used by basket-makers: the wood is white and very tough: the cotton will make ordinary paper, and may serve some of the purposes of genuine cotton: the bark may be used in dyeing, and medicinally in agues.

The fourth species never rises into a tree: the bark is deciduous: the leaves are shorter than in the first sort, scarcely two inches long, of a broadish ovate figure rounded at the base, by no means linear; oblique, the width of the two sides being unequal: the stipules are remarkably large, varying from a roundish to a half-heart-shaped form, crenate, deciduous: female flowers and capsules much as in that sort. It is a native of several parts of Europe.

The fifth is distinguished by its sessile ovate smooth leaves, sharply and very finely but scarce apparently serrate; and its subcordate stipules. It becomes a tree, but never tall: the branches are round, very straight, cinereous: the leaves hard, with very minute and scarcely visible serratures, cinereous beneath, but smooth on both sides, rigid, appendicled with two ovate entire leaflets. It is a native of Lapland, &c.

The sixth species grows to be one of the largest trees of the kind: the branches break off easily at the shoot of the preceding year: the leaves are large, four inches long, an inch and half broad, distinctly and deeply serrate, smooth and shining on the upper side, glaucous underneath: the stipules scarcely any, but instead of them the footstalks are dotted with prominent glands: the catkins have two or three fugacious leaves at the base of the peduncle. It is a native of the greater part of Europe, especially the northern parts, and is of quick growth, soon forming a shade in wet places; the males are fittest for this purpose. Bees are fond of the male flowers.

The seventh grows to a considerable size, as four feet and a half in circumference at three feet above the ground, and thirty feet in height. It is generally esteemed for its long slender pendulous branches, which give it a peculiar character, and render it a beautiful object on the margin of streams or pools: the leaves minutely and sharply serrate, smooth on both sides, glaucous underneath, with the midrib whitish; on short petioles: the stipules, when present, roundish or semilunar and very small; but more frequently wanting, and then in their stead a glandular dot on each side: the catkins axillary, small, oblong: in the male the filaments longer than the scale, with two ovate erect glands fastened to the base: the female, on two leaved peduncles, scarcely longer than half an inch. It is a native of the Levant.

The editor of Miller's Dictionary remarks that in No. 6817, Aug. 25 to 27, 1801, of the St.

James's Chronicle, there is the following paragraph, but on what authority he is not acquainted:—"The famous and admired weeping willow, planted by Pope, which has lately been felled to the ground, came from Spain, inclosing a present to the late Lady Suffolk. Mr. Pope was in company when the covering was taken off; he observed that the pieces of stick appeared as if they had some vegetation, and added, Perhaps they may produce something we have not in England." Under this idea he planted it in his garden, and it produced the willow tree that has given birth to so many others."

The eighth species is a bushy shrub three or four feet high, with long slender tough purple shining branches: the leaves some opposite, others alternate, nearly linear, but broadest upwards, serrate chiefly towards the summit, very smooth, glaucous beneath, destitute of stipules: the male catkins are very slender, scarcely an inch long, nearly sessile, consisting of many thick-set flowers, the uppermost of which expand first: the scales black at the tip, hairy: nectary a solitary gland opposite to each scale: the stamens one solitary simple, never dividing, bearing an orange-coloured double or four-lobed anther: the female catkins exactly like the male in size and form. It is particularly distinguished by the length as well as delicate slenderness of its twigs, and its subglaucous spurge-like leaves, but above all by their extreme bitterness when chewed. It is a native of many parts of Europe.

The ninth rises to the height of nine or ten feet, and is a small slender tree: in the form of its leaves it differs from the eighth, being more truly lanceolate and taper-pointed, by no means obovate: the female catkins are somewhat longer, and twice as thick, and stand on longer stalks: the germ is sessile, ovate and silky; but the style is considerably lengthened out, quite smooth and naked: the stigmas also, instead of being short and ovate, are linear and considerably elongated: the leaves are less glaucous beneath and not so bitter: the rose-like excrescences are more common at the ends of the branches in it; whence its name of Rose-Willow. It is a native of many parts of Europe.

The tenth species is a shrub four or five feet high, with upright flexible and very tough branches, of a yellowish ash-colour, often purplish: the leaves alternate, on footstalks, two or three inches long, minutely toothed or somewhat serrate, principally towards the top; smooth on both sides except when very young; dark green above, glaucous beneath: the stipules none: the catkins on short stalks, cylindrical,

blunt, first red, then yellow, flowering first at the top. It is a native of some parts of Europe on the sandy banks of rivers, flowering in April.

With us it is cultivated in the fens, and preferred to all other willows or osiers for basket-work.

The eleventh is a shrub which has the branches very long, slender, tough, smooth, gray or purplish: the leaves about four inches long when full grown, slightly toothed or serrate, by no means entire, of a bright green on both sides, smooth in general, but sometimes sprinkled with a few slender hairs beneath: the stipules, if present, linear-lanceolate, a little toothed; but generally wanting. It appears to be little known, though amongst the most valuable as an osier. It is a native of this country, &c.

The twelfth species often becomes a large tree: the branches when young palish, downy: the leaves slightly tapering to a point at both ends, above green and scarce sensibly downy, underneath pale green with a very thin wooliness: edge marked with some notches which are scarcely apparent unless carefully examined, but from the middle downwards evidently waved: the lower buds produce leaves, the upper ones catkins not leafy. It is useful for bees, as flowering early.

The thirteenth is more than six and sometimes near twelve feet high; in exposed boggy grounds spreading more, but not rising so high: the leaves alternate, rude, rugged, wrinkled and green above, beneath rough with hairs, the veins indistinct, the edge serrate, on loose petioles two lines in length: stipules in shape of half a heart, on each side serrate with three glands: the catkins brownish, placed below the leaves, on a peduncle with a few small spear-shaped leaflets. It is the common Sallow, and a native of Europe, flowering in April.

The fourteenth species, when suffered to grow without lopping, becomes a large and lofty tree: it is of quick growth, but when lopped soon decays: the trunk is straight with a gray rough bark full of cracks: the branches numerous, upright, but diffused, gray or brownish green, the upper ones often dusky red: the inner bark is green: the leaves sharply and elegantly serrate; shining but pubescent above, white and silky underneath: the male catkins cylindrical, blunt, from an inch and half to two inches in length, four lines in breadth, on peduncles half an inch long: the stamens two: the nectaries two, one before the stamens obcordate, the other behind them oblong: the female catkins slender, cylindrical, two inches long, three or four lines broad, on peduncles near an inch in length. It

is a native of Europe, flowering in April and May. Its wood is white, light, and tough.

The fifteenth is a very tall, slender, obsequious, quick-growing shrub: the leaf and flower-buds distinct: the leaves rolled back at the edges before they unfold. It is frequently arborescent: the bark grayish, smooth, with here and there a crack: the branches very long, straight, slender, tough: the leaves, especially the lower ones, a span long or more, waved at the edge: the male catkins ovate or oblong, from an inch to an inch and half in length, three or four lines in breadth, on very short peduncles: stamens two: nectary one: the female catkins ovate-oblong or cylindrical, of the same length with the male, half an inch broad; peduncle two lines long: the leaves being silvery underneath, the nectary in the male flower being long and slender, and the style in the female flower being very long, are sufficient marks to distinguish it by. It is a native of most parts of Europe. It is the true Osier.

There are a vast number of varieties in cultivation for the uses of the basket-maker. Evelyn has enumerated three vulgar sorts: one of little worth, being brittle, and very much resembling the Sallow, with reddish twigs, and more greenish and rounder leaves: a second, called Perch, of limber and green twigs, having a very slender leaf: the third totally like the second, only the twigs not altogether so green, but yellowish. This is the very best, he says, for use, tough and hardy. The most usual names applied to them by basket-makers about London are: the Hard-Gelster, the Horse-Gelster, Whyning, or Shrivelled-Gelster, Black-Gelster, in which Suffolk abounds. Then the Goldstones, the Hard and Soft, Brittle and worst of all the Goldstones; the Sharp and Slender-topped Yellow Goldstone; the Fine Goldstone. Then there is the Yellow Osier, the Green Osier, the Snake or Speckled Osier, Swallow-tail and Spaniard. To these, the editor of Miller's Dictionary says, may be added the Flanders Willow, which will arrive to be a large tree—with these coopers tie their hoops to keep them bent. Lastly, the White Swallow, used for green-work; and if of the toughest sort, to make quarter can-hoops. It is further suggested, that innumerable varieties are cultivated in the osier-grounds for the basket-makers; and the same frequently under different names in different places, so that it would be difficult and of little use to enumerate them; but that the Dutch and Wire Osiers are esteemed about London. The true Velvet Osier, which is a valuable sort, has, it is said, been made out to be distinct from the *viminalis*.

Culture.—All these plants are capable of being readily increased by cuttings of the young shoots of one or two years old, in lengths of half a yard or two or three feet; and those of several years growth in truncheons or sets, of from three or four to five or six feet long, according to the purposes for which they are designed, which strike root most readily in low moist soils. The proper season for planting them out is any time in open weather, from the beginning of autumn till March; but the early autumn and spring months are the best, according as the soil may be more moist. In the planting, a long iron-shod dibble is used for the smaller cuttings, and an iron crow for making holes for the larger sets, or holes may be made with a spade for very large long pole-cuttings; though some use no instrument in planting the smaller cuttings, but sharpen the ends of them, and thrust them into the ground, especially in soft land; but as this method is apt to force off the bark from the lower part of the cutting, it is best to cut the bottom of each cutting even, and plant them with some instrument in the above manner.

These sets are planted for different purposes; as for timber trees—to form osier grounds—to cut for poles,—for pollards for lopping, &c.

When they are intended to be raised for timber, the larger growing sorts, such as the white-yellow, and purple, or red willows, &c. should be chosen, taking cuttings of the strong young shoots, which should be planted at once where they are to remain, in any low marshy, or rather moist situation, where they grow with great rapidity. The ground should be prepared by proper digging, or ploughing, as may be most convenient, and then a quantity of cuttings of the strong young shoots, of one or two years' growth, cut to half a yard or two feet lengths, should be provided and planted in rows, only six feet asunder, and three or four distant in the rows, that they may draw each other up fast in growth, and allow for a gradual thinning, each cutting being inserted two parts of three into the ground. They soon emit roots, and shoot strongly at top in spring and summer; but to have them run up with clean stems for full standards, all should be cleared away but one of the strongest leading shoots for a stem, which should be suffered to run up at full length in its future growth. After a few years, when the trees approach one another, they should be thinned for poles, &c.; repeating the thinning a few years afterwards, according as the branches of the different trees interfere, leaving them at last about twelve or fifteen feet asunder, to attain their full growth: in this way they draw each other up very expeditiously with straight handsome stems, to forty

or fifty feet in height, or more; and in twenty or thirty years become fit to sell as timber.

When intended to form osier grounds for low stools, for producing twigs annually for the basket-makers, they should be planted in rows two or three feet asunder, and be always kept to low stools a foot high, in order to force out a more plentiful annual crop of twigs and rods, proper for use in one summer's growth. For this purpose, waste boggy land in the sides of large rivers are the most proper, both in respect to the soil, and the conveyance of the wands.

These situations should be dug over or ploughed, for the reception of the osiers: then, in the proper season, as above, a sufficient quantity of osier sets of different sorts, in cuttings of the one or two years old shoots, should be formed into two feet or two feet and half lengths, planting them in lines two feet and half distance, inserting each cutting from ten or twelve to fifteen inches into the ground, leaving the rest out to form the stool, and let them be two feet and half distant in each row: having thus formed the plantation, the cuttings will root firmly in the spring, and shoot at top tolerably strong in summer, each stool generally throwing out several shoots, of an erect growth. During the first summer, all large weeds should be kept down, that the stools may have full scope to produce the first shoots as strong as possible, which, by the end of autumn, will probably be advanced some considerable length; and if much wanted may be cut in the following winter or spring; but for full plantations they should generally be suffered to continue their growth for two years, till the stools are firmly rooted and become strong; then be cut down with all the tops close to the heads of the stools, which serve for poles, &c. Next year the stools shoot out strong, a numerous crop of twigs and rods, fit for cutting for the basket-makers in the winter following; and the stools still remaining, continue to furnish an annual crop fit for cutting every winter: the twigs when cut should be sorted in sizes, tied in bundles, and stacked up for use.

Where intended to cut for poles, the plantations of stools may be made in any waste watery situations, as along the sides of brooks, rivers, watery ditches, and other similar situations; to cut every three, four, five, or six years, according to the purposes for which they may be employed.

- In forming them, a quantity of sets, of two years old shoots, in cuttings about two feet and half long, should be provided, and planted in rows a yard asunder, introducing each cutting two parts of three into the ground; they readily grow, and each sends out several erect shoots, which,

in three or four years, will become large poles fit to be cut for use.

Large cuttings or truncheons, three or four feet long, may likewise be thrust down along the sides of rivers, brooks, ditches, &c. which will often take root, and shoot out strongly at top for poles.

When designed for pollard standards to cut over for poles, for hurdles, &c. also for fuel, every fifth, sixth, or seventh year, the sets or cuttings may be obtained in plenty from the loppings of any old pollard willows, &c. choosing the large straight poles, cut from about seven or eight to nine or ten feet lengths, which should be planted either with an iron crow, or some other similar implement, forced into the ground to make wide holes, two feet or two and a half deep, for their reception: or, if the ground be stubborn, the holes should be dug with a spade to that depth, planting one set in each hole, placing them from a foot and half at least to two feet and half in the ground, leaving six, seven, or eight above for the stem: these sets, though so large and long, if planted in moist places, readily strike root, and shoot out at top the following spring and summer, into many erect branches, which, after four or five years growth, become fit to lop for poles, &c. The trees thus continue to afford a lopping as above, or may be suffered to grow larger, according to the purposes for which the loppings may be wanted.

When for the purpose of forming hedges quickly, either as fences, blinds, or shelter, cuttings, either of strong young shoots, formed in two or three feet lengths, and planted in a row half a foot asunder, and twelve to fifteen or eighteen inches deep, may be employed, or larger truncheons of several years growth, cut into sets, two, three, four, or five feet long or more, be used: in either case, when the sets have made the first year's shoot, the shoots may be plashed together in winter, both to stiffen the hedge and give it a thicker form, and afterwards be kept regular by clipping it annually, or suffered to take its own natural growth.

But, in order to form a willow hedge as quickly as possible, large straight sets of five or six feet long may be used, planting them chequer-ways, placing each set half a yard in the ground, leaving three or four feet above; which, being arranged, cross one another in the above manner; and ranged all of an equal height, they at once form a good firm fence.

And where a speedy fence is wanted, by way of blind or shelter, a quantity of loppings, five, six, or seven feet long, well furnished with lateral branches to the bottom, may be provided and

planted in a deepish trench, pretty close together, which soon grow, and form a sort of fence immediately.

When for twigs for garden uses, a moist situation should be chosen, and a quantity of the most pliant kind of osier sets, or cuttings of the young shoots, half a yard or two feet long, should be provided and planted in rows, two parts of three into the ground. They grow freely, and furnish plenty of twigs every year, managing them as those in the osier plantations.

The after-culture in all these cases is principally the keeping down large weeds the first and second years after planting, but which is more particularly necessary in the plantations of young low cuttings, till they are a little advanced in their growth.

When intended for nursery collections, all the different sorts should be kept, being raised from young cuttings of a year or two old, in half-yard or two feet lengths, and planted in rows, two or three feet asunder, to grow till wanted for use.

Some of these sorts of willows may be used with good effect, as ornamental trees on the sides of ponds or other places, especially white, yellow, purple, sweet, almond-leaved, and weeping kinds, being disposed thinly in large out-plantations; but the Babylonian or Weeping Willow, for its curious pendulous growth, demands attention in a particular manner, and should be disposed singly, or detached, both by the side of water, and in spacious openings of grass ground, also near grottoes, cascades, caves, ruins, &c.

SALLAD HERBS, the different sorts of esculent plants from which herbs for sallads are collected. These by different sowings, plantings, &c. are obtained at all times of the year; but the most generally esteemed sorts may be comprised under the heads of Large, Small, and Occasional Sallad Herbs.

The first consist chiefly of the different sorts of lettuces; the different sorts of endive, and all the varieties of celery, which sorts are in the best perfection for use when arrived at the full growth; any of which may be eaten as a sallad alone, or all mixed together, or with a proper quantity of small sallading, especially in winter and spring; as the small sallading being of a warm nature renders the sallad more grateful and wholesome. Lettuces are generally esteemed most in summer, when full grown and firmly cabbaged, but may be used at all seasons. The endive and celery are excellent for autumn and winter sallads, being in full perfection from September to the end of November, when they are full grown and finely blanched, and often continuing in to-

lerable perfection all winter and spring. See **LACTUCA**, **CICHORIUM**, and **APIUM**.

The second sorts are cresses, mustard, radish, rape, and some others; in all of which herbs, the young leaves are the useful parts for the purpose of sallad, and are always in the best perfection when quite young, as a few days, or a week old at most, while in their first leaves; cutting them up, stalks and top together, close to the ground, as when used thus quite young they eat exceeding tender, with an agreeably warm relish, but become too hot by age. See **SMALL SALLAD HERBS**.

The last sorts are, principally corn sallad, or lamb's lettuce—purslane—spear-mint—watercress—borage and borage-flowers—nasturtium-flowers and the young leaves—chervil—burnet, and sometimes red-cabbage—radishes—red beet-root—finocchio, or Azorian fennel—sorrel—tarragon—young onions—cives—and sometimes horse-radish, incorporated with other herbs; most of which sorts are occasionally used in composition with other sallad herbs, and some alone as a sallad, such as red-cabbage, watercress, young borage, &c. See their respective genera.

SALLOW. See **SALIX**.

SALSOLA, a genus containing a plant of the shrubby evergreen kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Holostaceæ*.

The characters are: that the calyx is a five-parted perianth: segments ovate, concave, permanent: there is no corolla, unless the calyx be called so: the stamina have five very short filaments inserted into the segments of the calyx: the pistillum is a globular germ: style three-parted or two-parted, short: stigmas recurved: the pericarpium is an ovate capsule, wrapped in the calyx, one-celled: the seeds single, very large, spiral.

The species cultivated is *S. fruticosa*, Shrubby Saltwort, or Stone-Crop Tree.

It has the stem about two feet high or more, woody, erect, round, very much branched; the branches also erect, and thickly clothed with alternate, sessile, semi-cylindrical, bluntish, fleshy, even, almost upright, rather glaucous leaves: the flowers inconspicuous, axillary, sessile, solitary, green; with three small, concave, scarious bractes. The leaves have an herbaceous flavour, with a slight degree of salt and some acrimony. It forms an elegant evergreen shrub, flowering in July and August. It is a native of France, &c.

Culture.—This plant may be increased by layers or cuttings, though with difficulty in the latter method.

The young branches should be laid down in the spring, and when well-rooted, in the following autumn, be taken off and planted out where they are to remain, a warm sheltered situation being provided for the purpose.

Though these plants are inhabitants of the sea shores, they may be introduced in the borders and clumps of the shrubbery with other evergreens.

SALVIA, a genus containing plants of under-shrubby, herbaceous, and shrubby kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved perianth, tubular, striated, gradually widening and compressed at the top: mouth erect, two-lipped; lower lip two-toothed: the corolla one-petalled, unequal: tube widening at the top, compressed; border ringent, upper lip concave, compressed, curved inwards, emarginate; lower lip wide, trifid, middle segment larger, roundish, emarginate: the stamens have two filaments, very short; two threads are fastened transversely to these almost in the middle, on the lower extremity of which is a gland, on the upper an anther: the pistillum is a four-cleft germ: style filiform, very long, in the same situation with the stamens: stigma bifid: there is no pericarpium. Calyx very slightly converging, having the seeds in the bottom of it: the seeds four, roundish.

The species cultivated are: 1. *S. officinalis*, Garden Sage; 2. *S. grandiflora*, Broad-leaved Garden Sage; 3. *S. triloba*, Three-lobed Sage, or Sage of Virtue; 4. *S. sclarea*, Common Clary; 5. *S. argentea*, Silvery-leaved Sage or Clary; 6. *S. verbenaca*, Vervain Sage or Clary; 7. *S. Indica*, Indian Sage or Clary; 8. *S. Horminum*, Red-topped Sage or Clary; 9. *S. glutinosa*, Yellow Sage or Clary; 10. *S. Mexicana*, Mexican Sage; 11. *S. Canariensis*, Canary Sage; 12. *S. Africana*, Blue-flowered African Sage; 13. *S. aurea*, Gold-flowered African Sage; 14. *S. pomifera*, Apple-bearing Sage; 15. *S. formosa*, Shining-leaved Sage.

The first is a branching shrub, about two feet in height: the younger branches are tomentose and whitish: the leaves are wrinkled, cinereous white or tinged with dusky purple, on very short petioles, sometimes eared at the base: the flowers terminating, in long spikes composed of six-flowered whorls, approximating, yet distinct. It is a native of the South of Europe and Barbary.

The varieties are: the Common Green Sage, the Wormwood Sage, the Green Sage with a variegated leaf, the Red Sage, the Red Sage with a

variegated leaf, the Painted or Parti-coloured Sage with red leaves striped with white, or white red and green mixed, found, says Johnson, "in a country garden by Mr. John Tradescant, and by him imparted to other lovers of plants." There is also Spanish or Lavender-leaved Sage, in which the leaves are linear-lanceolate, very narrow and quite entire, in clusters on the side of the stalks; they are very hoary, and the branches are covered with a hoary down: the leaves on the upper part of the stalk are narrower than those of Rosemary; the flowers grow in closer spikes, and are of a light blue colour.

But the variety with red or blackish leaves is the most common in cultivation; and the Wormwood Sage is in greater plenty than the common green-leaved Sage.

In the second species the stalks do not grow so upright as those of the common Sage; they are very hairy, and divide into several branches: the leaves are broad, woolly, on long petioles, serrate, and rough on the upper surface: the leaves on the flower-stalks are oblong-ovate, on shorter petioles, and very slightly serrate: the whorls are pretty far distant, and few flowers in each; they are of a pale blue, and about the same size with those of the common sort. It flowers in June, and in good seasons the seeds ripen in autumn. This sage is preferred to all the others for tea. It is often called Balsamic Sage.

The third has the leaves narrower than those of the common sort; they are hoary, and some of them are indented on their edges towards the base, which indentures have the appearance of ears. The spikes of flowers are longer than those of the two preceding sorts, and the whorls are generally naked: the flowers are smaller, and of a deeper blue than those of the Common Sage. It is a native of the South of Europe.

The fourth species has the lower leaves large, in good ground seven or eight inches long, and four broad at the base, ending in blunt points: the stems large and clammy, about two feet high, with leaves of the same shape, but smaller, and sending out small opposite side branches: the flowers in loose terminating spikes, composed of whorls, of a pale blue colour. It is biennial, and a native of Syria, &c. flowering from July to September.

It is observed, that "a wine is made from the herb in flower boiled with sugar, which has a flavour not unlike Frontinac."

The fifth has the leaves of a thick consistence, having several irregular indentures on their borders: the stem near a foot and half high, sending out two or four branches near the bottom, which grow erect: the whorls of flowers large,

towards the top barren. It is a native of the island of Candia, and biennial, flowering in June.

The sixth has a perennial brown root, the thickness of the middle finger, striking deep into the earth, and furnished with numerous fibres: the stems nearly upright, two feet high, set with horizontal somewhat viscid hairs, purplish, especially at the joints: the root-leaves on long petioles, varying in form, oblong, rounded at the end, sometimes a little pointed, not unfrequently heart-shaped at the base, but more commonly the leaf runs down on each side the footstalk, and to a greater length on one side than on the other, very slightly hirsute, on the margin irregularly waved and serrate or toothed, paler beneath, veiny and marked with small glandular concave dots: stem-leaves somewhat remote, the lowermost on short footstalks, the uppermost sessile: the flowers in whorls, almost naked, containing about six flowers. It is a native of all the four continents, flowering during the whole summer from June, and even in October.

The seventh has the lower leaves heart-shaped, acutely crenate, of a thick consistence, seven or eight inches long, and four broad at the base, where they are eared: the stem four feet high, having two or three pairs of smaller leaves on the lower part at the joints: the upper part, for the length of two feet, has whorls of flowers, at two or three inches distance from each other, without any leaves under them: the calyx is hairy and blunt: the helmet of the corolla arched, erect and blue, terminating in a blue point; the two side segments of the under lip are of a violet colour; the middle segment, which is indented at the point, is white, and curiously spotted with violet on the inside; the two side lobes turn yellow before the flower drops. It is a native of India, flowering from May to July.

The eighth has the stems erect, about a foot and half high: the leaves shaped like those of the common Red Sage, gradually diminishing in size to the top: the stems have whorls of small flowers, and are terminated by clusters of small leaves, and forming two varieties; one with purple and another with red tops. For the sake of this comia they are preserved in gardens for ornament. They flower in June and July, and their seeds ripen in the autumn. It is a native of the South of Europe.

The ninth has an abiding root, composed of strong woody fibres: the leaves four inches long, and three broad at the base, of a pale yellowish green colour, upon footstalks three or four inches long: the stems strong, near four feet high, having smaller leaves below, and the upper part

VOL. II.

closely set with whorls of large yellow flowers. The whole plant is very clammy, and has a strong scent, somewhat like common Garden Clary. The flowers are used in Holland to give a flavour to the Rhenish wines. It is a native of Germany, &c. flowering from June to November.

The tenth has the stem shrubby, eight or ten feet high, sending out slender four-cornered branches of a purplish colour: the leaves thin, pale green, and hairy on their under side, on long slender footstalks: the flowers in close thick spikes at the end of the branches, having a fine blue colour. It is a native of Mexico, flowering from May to July.

The eleventh has the stem shrubby, five or six feet high, dividing into many branches covered with a flocky down: the leaves three inches and a half long, and an inch and half broad at the base, where are two acute angular ears: petioles long and woolly: the top of the stalk branches out into many footstalks, forming a sort of panicle: the flowers are of a light blue colour, and are ranged in whorled spikes, having two small leaves under each whorl. It is a native of the Canary Islands, flowering from June to September.

The twelfth rises with a shrubby stalk four or five feet high, dividing into branches: the leaves are ovate, of a gray colour: the flowers come out in whorls towards the end of the branches; they are of a fine blue colour, larger than those of the common Sage, appear in succession most of the summer months, and those which come early are often followed by seeds ripening in autumn. It is a native of the Cape.

The thirteenth also rises with a shrubby stalk seven or eight feet high, covered with a light-coloured bark, sending out branches the whole length which grow almost horizontally: the leaves are of a gray colour: the flowers, in thick short spikes at the end of the branches, are very large, and of a dark gold colour. It is a native of the Cape, flowering from May to November.

The fourteenth has the stem shrubby, four or five feet high, dividing into several branches: the flowers of a pale blue colour: the branches have often punctures made in them by insects, producing protuberances as big as apples, in the same manner as galls upon the Oak, and the rough balls upon the Briar. It is remarked by Martyn, that the common Sage has the same excrescences in the island of Candia or Crete, and that they carry them to market there under the name of Sage Apples. It was found at Candia.

The fifteenth has the stem suffruticose, the height of a man, upright, brachiate, somewhat knotty, loosely chapped, ash-coloured: the

3 C

branches and branchlets opposite, spreading, four-cornered, naked at the base, rufous: shoots four-grooved, green at the top, clammy: the leaves spreading, acute (in the garden bluntish), crenate-serrate, somewhat wrinkled, veined, with the midrib and veins prominent only beneath, subcoriaceous, greenish, but paler on the back: petiole scarcely half as long as the leaf, round on one side, grooved on the other: flowers very many, from the axils of the shoots, in a sort of whorl, in the garden commonly five together, the two lower of which are later: they are on short, spreading, one-flowered peduncles, jointed at the top. It is a native of Peru, flowering most part of the summer.

Culture.—These plants are in most of the sorts raised without much difficulty.

Culture in the Sage Kind.—This in all the varieties may be effected by slips or cuttings of the young shoots from the sides of the branches, sometimes also by bottom rooted off-sets, and likewise by seed. Slips both of the former and same year's growth may be used.

Those of the first sort may be employed in April, but the latter not till May, or later: these, however, most readily strike root, and assume a free growth.

In either case, moist weather should be chosen; and having recourse to some good bushy plants, a proper quantity of the outward robust side shoots, about five, six, or seven inches long, should be slipped off, trimming off all the lower leaves, then planted out in some shady border, with a dibble, in rows half a foot asunder, putting them down almost to their tops, giving water directly, to settle the earth close, as well as to promote an early emission of root-fibres, and repeating the waterings occasionally in dry weather: the slips in general soon emit fibres, and shoot freely at top: when they have a tendency to spindle up with slender shoots, or run up to flower, it is proper to top them short in order to force out laterals below, to assume a bushy growth: they mostly form tolerably bushy plants by the autumn, when, or in the spring following, they may be removed, with balls of earth about their roots, and planted where they are to remain, either in four-foot beds, or in continued rows, a foot and half asunder, if designed as a close plantation for use: those designed for the pleasure-ground should be disposed in the borders, &c. so as to afford variety.

Where there are rooted off-sets, they may be slipped off separately with the fibres to them, either as the plants stand in the ground, or the bunches of plants taken up and divided into as many separate slips as are furnished with roots,

being planted out at once where they are to remain.

The plants raised from young slips generally form the strongest and most bushy plants.

In raising these plants from seed, which is but seldom practised, it should be sown in April, in a bed of light rich earth, raking it in: the plants soon come up; and when about two or three inches high, should be pricked out, the strongest in nursery rows, half a foot asunder, to gain strength till the autumn or spring following, and then planted out with balls where they are to stand.

In the after-culture of this species and varieties, all that is requisite is the keeping them clean from weeds in summer, cutting down the decayed flower-stalks in autumn, and slightly digging between the rows in the same season, to keep them clean and decent during the winter, &c. But where this digging is not done in the autumn it should not be omitted in the spring.

The leaves of the Sage should be gathered with care and attention, not to cut the tops too close, to render the plants naked and stubby, especially when late in autumn and winter; in which they would be more liable to suffer from severe frost than when the head is preserved somewhat full and regular: besides, in this state the plants continue longer in a prosperous free growth.

When, in any old plantation, naked, stubby, or decayed parts occur, they should be cut out, and any straggling irregular growths reduced to order by occasional pruning in spring or summer, by which the plants will more readily emit fresh shoots and form full heads.

Fresh plantations of Sage should be formed as the old ones decline.

In continuing them where the ground is much impoverished, a little dry rotten dung should be pointed in lightly, to give more vigour to the plants.

Culture in the Clary Kind.—These in the herbaceous kinds are easily raised from seed, and in the perennial sorts by parting the roots.

The seed should be sown in March, in any bed or border of common earth, raking it in; and when the plants have got leaves of two or three inches growth, they should be planted out in showery weather, in rows eighteen inches distant, and at the same distance in the lines: they soon strike root, and grow large, furnishing large leaves, fit for use in autumn, winter, and the following spring.

The perennial sorts are raised from seed in the same manner, setting the young plants out in the summer in nursery-rows till autumn, when they should be planted out into the borders, &c.

The annual sorts may be sown in spring in the borders, in patches to remain.

The roots in the perennial kinds may be parted in autumn, or early in the spring, and planted out where they are to remain.

Culture in the tender Shrubby Kinds.—These are easily increased by cuttings of the young shoots; they should be planted in pots in the spring, and plunged in a hot-bed, where they soon emit roots at bottom and shoots at top, and should be gradually hardened to the full air: but cuttings planted in summer will often strike without the aid of a hot-bed when planted either in pots or in a bed of natural earth, under frames and lights, or covered close with hand-glasses, and shaded from the mid-day sun, being occasionally watered.

The young plants should afterwards be potted off separately, and managed as other shrubby exotics of the green-house.

The last sort requires a warm dry green-house in winter, and to be very sparingly watered. See GREEN-HOUSE PLANTS.

Some of the sorts are useful as culinary plants, others for the purpose of ornament in the borders, &c. and the tender sorts in green-house collections.

SAMBAC. See JASMINUM.

SAMBUCUS, a genus containing hardy deciduous trees, shrub and herbaceous perennials.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a one-leaved perianth, superior, five-parted, very small, permanent: the corolla one-petalled, rotate-concave, five-cleft, blunt: segments reflex: the stamina have five awl-shaped filaments, the length of the corolla: anthers roundish: the pistillum is an inferior, ovate, blunt germ: style none; but instead of it a ventricose gland: stigmas three, blunt: the pericarpium is a roundish one-celled berry: the seeds three, convex on one side, angular on the other.

The species cultivated are: 1. *S. nigra*, Common Elder; 2. *S. racemosa*, Red-berried Elder; 3. *S. Ebulus*, Dwarf Elder; 4. *S. Canadensis*, Canadian Elder.

The first species grows to a bushy tree twelve or sixteen feet in height, much branched, and covered with a smooth gray bark when young, which becomes rough on the trunk and older branches: the wood is hard, tough, yellow, polishing almost as well as the box-tree; the younger branches containing a very large proportion of medullary matter or pith: the leaves opposite, unequally pinnate: leaflets commonly

five, smooth, nearly equal at the base, with very small or no stipules: the cymes terminating, dividing into five principal branches, and many small ones: the flowers cream-coloured, with a sweet but faint smell, especially when dried. It is a native of Britain and many other parts of Europe; also of Africa, Japan, &c., flowering in May and June.

There are varieties with white or green berries, with variegated leaves; and the Parsley-leaved Elder, which has the leaflets narrower, and cut into several segments, which are again deeply indented on their edges regularly, in form of winged leaves: the stalks are much smaller, and the shoots are short; the leaves have not so strong an odour, and the berries are a little smaller.

There are also the Gold-striped-leaved, the Silver-striped-leaved, and the Silver-dusted Elder.

The second species sends up many shrubby stalks from the root, rising ten or twelve feet high, and dividing into many branches, which are covered with a brown bark: the leaves are opposite; the lower generally composed of two pairs of leaflets, terminated by an odd one, shorter and broader than those of the first, and deeply serrate; the upper have frequently but three leaflets; they are of a pale green colour and pretty smooth: the flowers are of an herbaceous white colour, appearing in April, and sometimes succeeded by berries, which are red when ripe. It is a native of Germany, Switzerland, Italy, &c.

The third has a creeping root: the stems herbaceous, three feet high, upright, roundish, grooved, leafy, somewhat enlarged at the joints, purplish, branched above; the branches opposite and upright: the leaves opposite, unequally pinnate, dark green, smoothish: leaflets four to six pairs, ovate-lanceolate, veined, acute, serrate, unequal, and generally glandular at the base, smooth above, downy with a slight roughness underneath, and whiter; the lowermost often lobed: the stipules large, leafy, serrate, sometimes accompanying a pair of leaflets as well as the whole leaf: the cyme terminating in three principal branches, and those dividing into many others, hairy and many-flowered: all the flowers pedicelled. It is a native of many parts of Europe.

It was formerly called Wallwort or Walewort, and Danewort, and differs from the first sort in being herbaceous, in having a creeping root, and narrower leaflets, more numerous, and sometimes lobed.

There is a variety with but leaves in which the roots do not creep so much, nor the stems rise

so high: the leaves have seldom more than seven leaflets, and towards the top only five, longer and narrower than in the above, deeply cut on their edges, and ending with winged acute points.

The fourth species rises to the height of twenty feet in its native situation, but here, it is seldom much more than half that height: the leaves have generally seven or nine leaflets, which are longer and narrower than those of the first sort: the berries are smaller, of the same black colour, but not so full of juice; nor have the leaves so strong a scent: it is shrubby, but commonly perishes above ground in winter: the cymes are of the same structure as in the first; and the stipules are filiform and truncate, as in that, not expanded into leaflets, as in the third: the berries are reddish, and said to be eatable. It is a native of North America, flowering from June to August.

Culture.—The first and second sorts may be readily increased from cuttings, or by sowing their seeds; but the former being the most expeditious method, it is generally practised. The season for planting the cuttings is any time from the autumn to the spring; in doing of which, there is no more care necessary than to thrust them about six or eight inches into the ground, as they take root readily, and may afterwards be planted out where they are to remain, which may be upon almost any soil or situation, as they are extremely hardy: if their seeds be permitted to fall upon the ground, they often produce plenty of plants the succeeding summer.

They are often planted for fences, on account of their quick growth; but as their bottoms become naked in a few years, they are not by any means proper for that purpose. In this intention the cuttings should be planted in one or two rows, where they are to remain.

This sort of plants should not be planted near habitations, as at the season when they are in flower they are said to emit such a strong scent as to occasion violent pains in the heads of those who abide long near them.

The first sort succeeds in any soil or situation.

The third is increased rapidly, wherever it is once planted, by its creeping roots; and the fourth puts out roots from cuttings almost as easily as the common sort; but being liable to injury from severe frosts, it should be planted in a sheltered situation, and rather dry soil.

All the sorts afford diversity in large ornamental plantations, the common sorts being only thinly introduced.

The fruit of the common sort is frequently made use of for the purpose of making wine from it.

SAND, an earthy substance that is frequently made use of in the culture of different sorts of flowers and plants which require a dry soil.

SAND-BOX TREE. See HURA.

SANGUINARIA, a genus containing a plant of the low herbaceous flowering kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rhoeadeæ*.

The characters are: that the calyx is a two-leaved perianth, ovate, concave, shorter than the corolla, caducous: the corolla has eight petals, oblong, blunt, spreading very much, alternately interior and narrower: the stamina have very many filaments, simple, shorter than the corolla: anthers simple: the pistillum is an oblong compressed germ: style none: stigma thickish, two-grooved with a streak, height of the stamens, permanent: the pericarpium is an oblong capsule, ventricose, sharp at both ends, two-valved: the seeds very many, round, acuminate.

The species is *S. Canadensis*, Canadian Sanguinaria, Bloodwort, or Puccoon.

It has a tuberous, thick, fleshy root, placed transversely, with several slender fibres descending from it, of a reddish saffron colour, and yielding a juice of the same hue, which is bitter and acrid, and flows also from the leaves and footstalks when cut. In the spring the root puts forth slender round smooth stems, palish green or brownish tinged with purple, each terminated by a little conical head, which expands into a white flower of eight petals, at first concave, then flat, and finally rolled back so as to be convex, marked with slender streaks: filaments white, with saffron-coloured anthers. When the flowers are about expanding, a single leaf comes out upon each flower-stalk, at first small, compressed, and protecting the flower with its foot-stalk; but afterwards becoming larger, and unfolding into lobes, like those of the fig, which are thickish, smooth, internally of a deep glaucous green, externally of a whitish glaucous colour with frequent veins, most conspicuous on the outside; on petioles which are flat and slightly grooved on the inside, and convex on the outside. Three or four flower-stems arise from each root, and are surrounded at the base by oblong, membranaceous, tender, striated scales: the root, leaves, and flowers have no smell. It is a native of America, and flowers here in the beginning of April.

There are varieties with single flowers, with semi-double flowers, and full flowers.

Culture.—This plant is readily increased by parting the roots, and planting them out in the

borders or other places where they are to remain, in the autumnal season, when the leaves and stems decay.

They should have a loose soil, with a mixture of bog earth and rotten leaves, and sheltered situation, not too much exposed to the sun: the roots should not be parted oftener than every two years.

They afford variety in the borders, clumps, and other parts among other low-growing bulbous-rooted plants.

SANTOLINA, a genus comprising plants of the low, under shrubby, evergreen, and herbaceous kinds.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, hemispherical, imbricate: scales ovate-oblong, acute, pressed close: the corolla compound uniform, longer than the calyx: corollæ hermaphrodite, equal, numerous; proper one-petalled, funnel-form: border five-cleft, revolute: the stamens have five capillary filaments, very short: anther cylindrical, tubulous: the pistillum is a four-cornered oblong germ: style filiform, length of the stamens: stigmas two, oblong, depressed, truncate: there is no pericarpium: calyx unchanged: the seeds solitary, oblong, four-cornered: down none: the receptacle chaffy, flattish: chaffs concave.

The species are: 1. *S. Chamæcyparissus*, Common Lavender-cotton; 2. *S. rosmarinifolia*, Rosemary-leaved Lavender-cotton; 3. *S. alpina*, Alpine Lavender-cotton; 4. *S. anthemoides*, Chamomile-leaved Lavender-cotton.

The first has a shrubby stalk dividing into many woody branches, with slender hoary leaves, indented four ways, and having a rank strong odour when handled: the branches divide towards the top into several slender stalks, the lower parts of which have a few small leaves of the same shape as the others, but naked above, and terminated by a single flower, composed of sulphur-coloured fistular florets, without any ray. It rises nearly three feet high in a dry soil and sheltered situation. It is a native of the South of Europe; as Spain and Italy.

There are several varieties of the Hoary Lavender-cotton, which branches out like the common sort, but seldom grows so tall: the branches are divided into a great number of stalks, which are short, hoary, and below set very closely with shorter, thicker, and whiter leaves: the flowers are much larger, and the brims of the florets more reflexed, and of a deeper sulphur-colour. It grows naturally in Spain.

The Creeping Lavender-cotton, which is of still lower stature, seldom rising more than fifteen or sixteen inches high: the branches spread horizontally near the ground, and have shorter leaves than either of the former; they are hoary, and finely indented; the stalks are short, and are each terminated by a single flower of a bright yellow colour, and larger than those of the common sort.

And the dark-green Lavender-cotton, which rises higher than these: the branches are more loosely disposed, and more diffused; are more slender, smooth, and have very narrow long leaves of a deep green colour, indented only two ways; the stalks are slender, naked towards the top, and terminated by single flowers of a gold colour.

The second species is herbaceous, scarcely suffruticose: the leaves at the edge on both sides crenulate with tubercles in two rows, but on the flowering-stalk linear, toothleted on each side at the top: the peduncles long, terminating, one-flowered. According to some, the stalks are shrubby, about three feet high, sending out long slender branches, with single linear leaves about an inch and half long, pale green and entire: the stems terminated by large, singular, globular flowers of a pale sulphur-colour. It is a native of Spain, flowering from July to September.

There is a variety in which the branches are shorter, thicker, and closer set with leaves; which come out in clusters, are shorter, and blunt: the flower-stalks are sparsely disposed, and have leaves to their top: the flowers are small and of a yellow colour.

In the third, the flowers are without any female florets: it is herbaceous, and has the leaves cut into very fine segments. It is a native of Tuscany, flowering in June.

The fourth species is a palm in height: the stem villose, leafy: the leaves, like those of chamomile, pubescent: the peduncles terminating, longer than the leaves, when fruiting stiffish: the flowers are of a sulphur colour. It is a native of Spain, Italy, and Siberia.

Culture.—These plants may be raised from slips or cuttings, which should be planted out in a border of good light fresh earth in the spring season, water and shade being afforded till they have stricken root, being afterwards kept clean from weeds till the beginning of autumn, when they should be taken up with care, and planted out where they are designed to remain: when the business of removing them cannot be performed at the above period, it should be delayed till the spring following, as when removed late they are apt to be destroyed in the winter: they succeed best in a poor dry soil.

They have a very ornamental effect in the borders and clumps, when kept properly trimmed in and tastefully intermixed with other similar plants, in the fronts and more conspicuous parts.

SAPINDUS, a genus containing plants of the tree, shrubby, and tender exotic kinds.

It belongs to the class and order *Ocandria Trigynia*, and ranks in the natural order of *Trilatae*.

The characters are: that the calyx is a four-leaved perianth, spreading; leaflets subovate, almost equal, flat, spreading, coloured, deciduous; two of them exterior: the corolla has four ovate, clawed petals; two of them more approximating: nectary of four oblong concave erect leaflets, inserted into the base of the petals: glands four, roundish, inserted also into the base of the petals: the stamina have eight filaments, length of the flower; anthers cordate, erect: the pistillum is a triangular germ: styles three, short: stigmas simple, obtuse: the pericarpium has three capsules, fleshy, globular, connate, inflated: the seed is a globular nut (two-celled).

The species are: 1. *S. Saponaria*, Common Soap-berry Tree; 2. *S. rigidus*, Ash-leaved Soap-berry Tree.

There are other species that may be cultivated for variety.

The first rises with a woody stalk in its native situation, from twenty to thirty feet high, sending out many branches towards the top, which are garnished with winged leaves, composed of three, four, or five pair of spear-shaped leaflets, which are from three to four inches long, and an inch and a quarter broad in the middle, drawing to a point at both ends: the midrib has a membranaceous or leafy border running on each side from one pair of leaflets to the other, which is broadest in the middle between the leaflets; they are of a pale green colour, and are pretty stiff; the flowers are produced in loose spikes at the end of the branches; are small and white, making no great appearance: these are succeeded by oval berries as large as middling cherries, sometimes single, at others two, three, or four are joined together; these have a saponaceous skin or cover, which incloses a very smooth roundish nut of the same form and of a shining black when ripe. It is a native of the West Indies.

The nuts were formerly brought hither for buttons to waistcoats, some tipped with silver, and others with different metals, and were very durable, as they did not wear, and seldom broke.

The second species, according to Miller, has a strong woody stalk which rises about twenty feet high, sending out many short strong branches, covered with a smooth gray bark: the leaves composed of two pairs of spear-shaped leaflets, very stiff and smooth; the inner pair small, seldom more than an inch and half long; the two outer near three inches long, and almost an inch broad in the middle, drawing to points at both ends; they are oblique to the footstalk, of a pale green, and sit close to the midrib: the ends of the branches are divided into two or three footstalks, each sustaining a loose spike of flowers: the berries roundish; generally two, three, or four joined together. It is a native of the West Indies.

Culture.—These plants may be raised from seeds, procured from their native situations, which should be sown in small pots filled with rich fresh earth early in the spring, plunging them in a hot-bed of bark, and watering them frequently:—when the plants appear, the glasses should be raised daily to admit fresh air, and when they have had some growth, they should be shaken out of the pots, carefully separated, and planted in distinct pots filled with light rich mould, re-plunging them in the hot-bed, and shading them from the sun till they have stricken root, when they should have free air admitted daily when the weather is warm, and be frequently watered: as they soon fill the pots with their roots, they should be often removed into larger ones, and be gradually inured to the open air, as when too much forced in the summer they are apt to die in the winter. In the beginning of the autumn they should be removed into the bark-bed of the stove, or be placed upon the shelves of it, where they often succeed better, being managed as other stove plants of the same nature.

They afford variety in stove collections.

SAPONARIA, a genus containing plants of the herbaceous perennial and annual kinds.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a one-leaved, naked, tubular, five-toothed permanent perianth: the corolla has five petals; claws narrow, angular, length of the calyx; border flat, with the plates wider outwards, blunt: the stamina have ten awl-shaped filaments, length of the tube of the corolla, alternately inserted into the claws of the petals, five later; anthers oblong, blunt, incumbent: the pistillum is a subcylindrical germ: styles two, straight, parallel, length of the stamens; stigmas acute: the peri-

carpium is a capsule, length of the calyx, covered, one-celled, oblong: the seeds numerous, small: the receptacle free.

The species cultivated is *S. officinalis*, Common-Soapwort.

It has a perennial root, striking deep and spreading wide, and creeping by runners: the stems a foot and half in height, upright, round, rigid, jointed, smooth, often reddish, paniced at top: the leaves opposite, connate, quite entire, three-nerved, smooth: the panicle hemispherical, many-flowered, bracteolate: the corolla flesh-coloured or rose-coloured, varying to white, smelling sweet: the petals entire, crowned at the throat: the seeds blackish, with a granulated surface. It is a native of the Southern parts of Europe, flowering from July to September.

There are two varieties: as with double flowers, which is preserved in gardens, but has the same fault with the single one, of spreading very much at the root.

The hollow-leaved, in which the roots do not spread like those of the common sort: the stalks are shorter, thicker, and do not grow so erect; they rise a foot or more in height; the joints are very near and swelling: the leaves are produced singly on the lower part of the stalks, but towards the top they are often placed by pairs; they are about three inches long and two broad, having several longitudinal veins or plaits, and are hollowed like a ladle: the flowers are disposed loosely on the top of the stalk, have large cylindrical calyxes, only one petal, and scarcely any visible stamens; they are of a purple colour, and appear in July.

Culture.—These plants are readily increased by parting the roots, and planting them out either in the autumn or early spring: the hollow-leaved variety may likewise be raised from slips or cuttings planted at the same seasons. It should have a dry situation, where the air is good.

The double sort affords variety in the borders and other parts, and the hollow-leaved variety is useful for ornamenting rock-work.

SARRACENIA, a genus containing plants of the herbaceous perennial kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a double perianth; lower three-leaved: leaflets ovate, very small, deciduous; upper five-leaved; leaflets subovate, very large, coloured, deciduous: the corolla has five ovate petals, bent in, covering the stamens: claws ovate-oblong, straight: the stamina have numerous small filaments: anthers simple: the pistillum is a roundish germ: style

cylindrical, very short: stigma clypeate, peltate, five-cornered, covering the stamens, permanent: the pericarpium is a roundish five-celled capsule: the seeds numerous, roundish, acuminate, small.

The species are: 1. *S. flava*, Yellow Side-saddle Flower; 2. *S. purpurea*, Purple Side-saddle Flower.

The first has the leaves near three feet high, small at the bottom, but widening gradually to the top; they are hollow, and arched over at the mouth like a friar's cowl: the flowers grow on naked pedicels, rising from the root to the height of three feet, and are of a green colour. It is a native of Carolina, Virginia, &c. flowering in June and July.

The second species has a strong fibrous root, which strikes deep into the soft earth, from which arise five, six, or seven leaves, in proportion to the strength of the plant; these are about five or six inches long, hollow like a pitcher, narrow at their base, but swell out large at the top; their outer sides are rounded, but on their inner side they are a little compressed, and have a broad leafy border running longitudinally the whole length of the tube; and to the rounded part of the leaf there is on the top a large appendage or ear standing erect, of a brownish colour; this surrounds the outside of the leaves about two thirds of the top, it is eared at both ends, and waved round the border: from the centre of the root, between the leaves, arises a strong, round, naked footstalk, about a foot high, sustaining one nodding flower at the top: the leaflets of the upper calyx are obtuse, and bent over the corolla, so as to cover the inside of it; they are of a purple colour on the outside, but green within, only having purple edges: the petals are of a purple colour, and hollowed like a spoon. It is a native of most parts of North America, in boggy situations.

Culture.—As these plants grow naturally in soft boggy situations, they are raised with difficulty here. The best mode is to procure them from the places of their natural growth, and to have them taken up with large balls of earth to their roots, and planted in tubs of earth; they should be constantly watered during their passage, otherwise they decay before they arrive: as there is little probability of raising these plants from seeds, so as to produce flowers in many years, if the seeds should even grow, young plants should be taken up for this purpose, as they are more likely to stand than those which have flowered two or three times. When the plants are brought over, they should be planted into pretty large pots, which should be filled with soft spongy earth, mixed with rotten wood, moss, and turf, which is very like the natural

soil in which they grow. These pots should be put into tubs or large pans which will hold water, with which they must be constantly supplied, and placed in a shady situation in summer; but in winter be covered with moss, or sheltered under a frame, otherwise they will not live in this climate; having free air admitted in mild open weather.

SASSAFRAS. See **LAURUS**.

SATTIN, WHITE. See **LUNARIA**.

SATUREIA, a genus containing plants of the low under-shrubby and herbaceous perennial and annual kinds.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved perianth, tubular, striated, erect, permanent: mouth five-toothed, almost equal, erect: the corolla one-petalled, ringent: tube cylindrical, shorter than the calyx: throat simple: upper lip erect, blunt, acutely emarginate, length of the lower lip: lower lip three-parted, spreading; segments blunt, equal, the middle one a little larger: the stamina have four filaments, setaceous, distant, scarcely the length of the upper lip; the two lower a little shorter: anthers converging: the pistillum is a four-cleft germ: style setaceous, length of the corolla: stigmas two, setaceous: there is no pericarpium: calyx converging, containing the seeds in the bottom: the seeds four, roundish.

The species cultivated are: 1. *S. montana*, Winter Savory; 2. *S. hortensis*, Summer Savory; 3. *S. juliana*, Linear-leaved Savory; 4. *S. Thymbra*, Whorled Savory; 5. *S. capitata*, Ciliated Savory.

The first is a perennial plant, with a shrubby low branching stalk: the branches rise about a foot high, are woody, and have two very narrow stiff leaves, about an inch long, opposite at each joint: from the base of these come out a few small leaves in clusters: the flowers axillary upon short footstalks, shaped like those of the second sort, but larger and paler. They appear in June, and the seeds ripen in autumn. It is a native of the South of France and Italy.

The second species is an annual plant, with slender erect stalks about a foot high, sending out branches at each joint by pairs: the leaves opposite, about an inch long, and one eighth of an inch broad in the middle, stiff, a little hairy, and having an aromatic odour if rubbed: the flowers towards the upper part of the branches axillary; each peduncle sustaining two flowers: the corolla pale flesh-colour. It is a native of the South of France and Italy, flowering from June to August.

The third has very slender woody stalks, which grow erect, about nine inches high, sending out two or three slender side branches towards the bottom: the leaves opposite, stiff: the flowers in whorls for more than half the length of the stalk, seeming as if they were bundled together: the corolla small and white: the whole plant has a pleasant aromatic smell. It is a native of Italy, flowering from May to September.

The fourth species rises about two feet high with a woody stem, and divides into many branches, so as to form a small bush: the leaves somewhat like those of Common Savory, having a strong aromatic scent when bruised.

In this the whorls are four or five, whereas in the preceding there are nineteen or twenty. It is a native of the island of Candia.

The fifth has a low shrubby stalk, which sends branches on every side, about six inches long, and hoary: the leaves stiff, narrow, acute-pointed: the flowers in short roundish spikes at the end of the branches, small and white: the whole plant is hoary and very aromatic. It never produces seeds in this climate. It is a native of the Levant, flowering from June to October.

Culture.—The first sort may be raised from seeds, or by planting slips.

The seeds should be sown in the early spring, as the end of March or beginning of April, on a bed of light rich earth, raking it in lightly; when the plants appear they should be occasionally watered, and kept properly thinned.

Some of these plants, when a few inches high, are often taken up, and planted out in nursery rows six inches apart in moist weather, to remain to the autumn or spring, and then planted out with balls of earth about their roots, in rows a foot asunder, to remain.

But the better method is by planting slips or cuttings at the above period, which readily take root, and form good plants, which in the autumn may be planted out with balls to their roots, in beds or rows a foot apart,

The second sort is raised from seeds, which should be sown thinly in the beginning of April upon a bed of light earth, where the plants are to remain.

Some, however, transplant them in the same manner as the above.

The plants should afterwards be kept clean from weeds, and managed in the same manner as has been directed for Marjoram.

The other tender sorts may be increased by slips or cuttings of the most strong side-shoots, planting them out in pots, (or in a shady border protected by mats) the pots being plunged in a moderate hot-bed: they soon begin to grow, and should have free air and water: when well

rooted in the autumn, they should be removed into separate small pots, filled with fresh undunged mould, and placed in the shade till well rooted, and afterwards in a sheltered situation till the autumn, when they should be taken under a garden frame, having free air when the season is fine, but be well protected from frost.

As these plants seldom continue more than a few years, some should be frequently raised as a supply against they decline.

The two first sorts are useful pot-herbs, and the other kinds afford variety among collections of green-house plants.

SATYRIUM, a genus containing plants of the bulbous-rooted, hardy-flowering perennial kind.

It belongs to the class and order *Gynandria Diandria*, and ranks in the natural order of *Orchideæ*.

The characters are: that the calyx is, as the spathes, wandering: spadix simple: the perianth none: the corolla has five ovate-oblong petals: three exterior; two interior converging upwards into a helmet: nectary one-leafed, annexed to the receptacle by its lower side between the division of the petals; upper lip erect, very short; lower flat, pendulous, prominent behind at the base in a scrotiform bag: the stamina have two filaments, very slender and very short, placed on the pistil: anthers obovate, covered by the two-celled fold of the upper lip of the nectary: the pistillum is an oblong germ, twisted, inferior: style fastened to the upper lip of the nectary, very short: stigma compressed, obtuse: the pericarpium is an oblong capsule, one-celled, three-keeled, three-valved, opening in three parts under the keels, cohering at the top and bottom: the seeds numerous, very small, irregular like saw-dust.

The species are: 1. *S. hircinum*, Lizard Satyrion, or Lizard-flower; 2. *S. viride*, Frog Satyrion; 3. *S. albidum*, White Satyrion.

The first frequently attains the height of three feet, and produces from twenty to sixty or more flowers, remarkable for their fetid goat-like smell: the upper part of the lip is downy, and marked with elegant purple spots on a white ground; otherwise the flowers are more singular than beautiful: the leaves are near five inches long and half an inch broad; the spike of flowers is six inches in length: the corolla of a dirty white, with some linear stripes and spots of a brown colour; the middle segment of the lip of the nectary is two inches long. It is a native of Germany, &c.

It is often called Goat Orchis: "It has been occasionally met with in the neighbourhood about Dartford; but the greediness of the collectors has frequently endangered its total de-

struction, and in some seasons none can be found in flower."

"The circumstance of its varying in size and the breadth of the leaves, has given occasion to old authors to make two species of it: the flowers are sometimes quite white."

2. "It was found at the Cape of Good Hope, on the top of the Table mountain; whence its trivial name."

3. "It is large and panicled: found at the Cape."

4. "This is a fathom in height, with large orange coloured flowers."

5. "In this the lip is muricate with white and purple prickles. Both these were also found at the Cape."

The second species has a stem from five to eleven inches high, and solid, with unequal sharp angles, formed from the edges of the leaves and bractes: the spike lanceolate, from one to three inches long, loose with few flowers: the bractes subulate-lanceolate, keeled, somewhat bowed-in. It is a native of many parts of Europe, flowering from May to August.

The third has the stem from nine to fifteen inches high: the lower leaves oval, sheathing the stem; upper lanceolate, acute: the flowers very numerous, in a long (an inch and half, cylindrical,) close spike: the bractes lanceolate, very acute, longer than the germ: the petals white, oval-lanceolate, all converging: lip of the nectary short, green, divided into three acute segments, the middle one longest and more blunt, the spur blunt, about half as long as the germ. It is a native of Scania, Denmark, &c. flowering in June and July.

Culture.—These plants are not raised without some difficulty: the best mode of increasing them is by taking up the roots with a good ball about them from their natural situations, and planting them in a soil as similar as possible, where they are to grow, letting the ground around them afterwards remain wholly undisturbed.

They sometimes also succeed by seed and offsets from the roots planted out after the stems decay.

They afford variety in borders among other similar plants.

SAVIN. See *JUNIPERUS*.

SAVORY. See *SATUREIA*.

SAVOY CABBAGE. See *BRASSICA*.

SAXIFRAGA, a genus containing plants of the low hardy herbaceous perennial kind.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-

leafed perianth, five-parted, short, acute, permanent: the corolla has five petals, spreading, narrow at the base: the stamina have ten awl-shaped filaments: anthers roundish: the pistillum is a roundish acuminate germ, ending in two short styles: stigmas blunt: the pericarpium is a subovate two-beaked capsule, two-celled, opening between the points: the seeds numerous, minute.

The species mostly cultivated are: 1. *S. Cotyledon*, Pyramidal Saxifrage; 2. *S. granulata*, White Saxifrage; 3. *S. crassifolia*, Thick-leaved Saxifrage; 4. *S. umbrosa*, London Pride; 5. *S. hypnoides*, Mossy Saxifrage, or Ladies' Cushion; 6. *S. sarmentosa*, China Saxifrage; 7. *S. rotundifolia*, Round-leaved Saxifrage.

There are other species that may be cultivated.

The first has the panicle very much branched, many-flowered, or branched a little with few flowers: the petals unspotted or spotted; and according to Miller, who has made three species of it, the roots are perennial and fibrous, and the leaves are gathered into circular heads, embracing each other at the base like the common Houseleek, in some of the sorts tongue-shaped, about two inches long, and a quarter of an inch broad: the stem about a foot high, purplish, a little hairy, and sending out several horizontal branches the whole length: the flowers are in small clusters at the end of the branches; white with several red spots on the inside. But in others the leaves are smaller. It is a native of the Alps.

It is observed, that when these plants are strong they produce very large pyramids of flowers, which make a fine appearance; and being kept in the shade, and screened from wind and rain, continue in beauty a considerable time: they flower in June. There are several varieties.

The second species has the root composed of several little grains or knobs, attached to one main fibre, and throwing out small fibres from their base: the stem is erect, round, pubescent, leafy, somewhat viscid, branched and panicked at top, of a brown or reddish hue, with which colour the leaves, &c. are also tinged, giving the whole herb a rich glowing appearance; these parts are also clothed with the same kind of hairs, especially the calyx, which is very clammy to the touch: the leaves are somewhat fleshy, lobed, and cut; those next the root on long foot-stalks; those on the stem alternate, subsessile. It is a native of Europe, flowering in May.

It varies with double flowers, in which state it is cultivated as an ornamental plant.

The third has the root superficial, black,

scaly, with the relics of dead leaves, the thickness of a finger or thumb, round, sending down filiform fibres from the lower surface: the stems from the axils of the leaves of the year preceding at the tops of the roots alternate, very short, almost upright, covered with the sheaths of the leaves, quite simple, but branched in autumn: the leaves three or four, alternate, spreading very much, obovate-oblong, crenulate, subretuse, very smooth, veined, a span long, flat, coriaceous: the petioles shorter by half than the leaves, roundish, channelled, smooth, with a wide membrane at the base, of an ovate form, embracing, and in the winter season serving for a gem: the scape or peduncle terminating, solitary, erect, a span high, the thickness of the little finger, roundish, very smooth, purplish, almost naked, many-flowered: the panicle contracted, naked, blood-red, composed of pedate racemes: the flowers inferior, drooping, pedicelled: the pedicels short, round, rugged.

It is observed, that "the stem changes every year into root; that which flowers one year losing its leaves during the winter, turning to the ground, becoming black, and putting forth fibres:" and after the plant has flowered, the stem puts forth branches from the axils of the leaves, which have the panicle of flowers for the next year included in their gems.

According to Curtis, the leaves are large, red on the under, and of a fine shining green on their upper surface, and may be ranked among the more handsome kinds of foliage: the flowering stems, according to the richness and moisture of the soil in which they are planted, rise from one to two or even three feet high; at top supporting a large bunch of purple pendulous flowers, expanding in April and May, and, if the season prove favourable, making a fine appearance. It is a native of Siberia.

It is remarked, that "there is another Saxifrage in gardens, exceedingly like this in appearance, but differing, in producing larger bunches of flowers, and in having larger, rounder, and more heart-shaped leaves."

The fourth species has the leaves all radical, aggregate in tufts, spreading, running down into the petiole, even and quite smooth, often purple beneath: the scape a span high, erect, red, hairy, many-flowered, with a few small alternate bractes: the flowers upright: the calyx finally reflexed: the petals obovate-lanceolate, white or flesh-coloured, most beautifully dotted with yellow and dark red: the germ altogether superior, rose-coloured: the capsule ventricose, tipped with purple. It is a native of Ireland and England, flowering in June and July. It has the names of None-so-pretty, and London Pride.



Painted by J. Edwards

London Published 1841 by G. Kearley Fleet Street

Engraved by F. Langton

Scabiosa atropurpurea
Sweet Scabious

Scilla campanulata
Bell-flowered Squill

The fifth has long slender fibrous roots, throwing out many procumbent leafy shoots, which grow matted together, forming thick tufts: from the common origin of these arises a solitary erect round stem, bearing two or three straggling linear undivided leaves, and terminating in an upright panicle of a few large white flowers: the leaves are alternate, linear, acute, pale green, smooth, their edges only often hairy with soft white woolly threads: the leaves on the shoots simple and undivided; those at the bottom of the stem all deeply three-cleft, with the segments divaricate. According to Withering, the stem, fruitstalks, and calyx are thickly set with short hairs terminated by red globules, and the rest of the plant thinly set with fine white hairs. It is a native of Britain, flowering in May, and often again sparingly in July and August.

The sixth species has the root-leaves petioled, cordate-suborbicular, hairy, crenate, with blunt lobules, oleraceous, having white veins on the upper surface, beneath liver-coloured: the petioles roundish, longer than the leaf: the stem herbaceous, round, a foot and half high, almost leafless, pubescent, as the whole herb is, with hairs standing out; the whole raceme compound, the partial racemes drooping at the end before they flower. Branched runners proceed in abundance from the axils of the root-leaves, terminating in rooting off-sets: three of the petals are smaller, whitish stained with red; two larger, white. It is observed, that "its round variegated leaves, and strawberry-like runners, with the uncommon magnitude of the two lower pendent petals, joined to the very conspicuous glandular nectary, in the centre of the flower, half surrounding the germ, render it strikingly distinct." It is a native of China and Japan, flowering in June and July.

The seventh has the lower leaves almost round, on long footstalks, deeply divided, hairy and green above, pale beneath: the stems erect, about a foot high, channelled and hairy, with kidney-shaped leaves: the stem puts out a few slender footstalks from the upper part, which, together with the stem itself, are terminated by small clusters of flowers, white spotted with red. It is a beautiful plant, and a native of Switzerland, &c.

Culture.—The first sort may be readily increased by planting off-sets taken from the sides of the old plants in small pots filled with fresh light earth, placing them in the shade during the summer, but letting them be exposed to the influence of the sun in winter: all the off-sets should be taken off, as by that means they will flower much stronger: the young plants afford flowers the second year.

The second sort may likewise be increased in the same way, which should be planted out where they are to remain in July, when the stems decay, in fresh undunged earth, giving them a shady situation till winter: they should be set out in large tufts, and when in the open ground have a shady place assigned them.

The third sort may be increased with little trouble by parting the roots, and planting them out in the spring or autumn in the open ground, or in pots in the former situation, being protected in severe weather, and in the latter removed to the green-house or a garden frame.

The fourth may also be raised by offsets in the same way, a shady situation being chosen.

The fifth sort is easily increased by planting its trailing rooted branches in the autumn where they are to remain: it should have a moist soil and shaded situation.

The sixth may be readily raised by the runners, which may be planted in pots to be placed in the green-house, though it will bear the open air in mild winters in a warm sheltered situation.

The last may be increased by parting the roots and planting them out in the early autumn: it should have a moist shady situation, with a rather stiff loamy soil.

They all afford ornament and variety in the clumps, borders, and other parts of pleasure-grounds; except the sixth, which must have a place in the green-house collection.

SCABIOSA, a genus containing plants of the herbaceous, annual, biennial, perennial, and shrubby kinds.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatie*.

The characters are: that the calyx is a common perianth, many-flowered, spreading, many-leaved: leaflets in various rows surrounding the receptacle and placed upon it, the inner ones gradually less: proper perianth double, both superior; outer shorter, membranaceous, plaited, permanent; inner five-parted, with the segments subulate-capillaceous: the corolla universal equal, often from unequal ones: proper one-petalled, tubular, four- or five-cleft, equal or unequal: the stamina have four filaments, subulate-capillary, weak: anthers oblong, incumbent: the pistillum is an inferior germ, involved in its proper sheath as in a calycle: style filiform, length of the corolla: stigma obtuse, obliquely emarginate: there is no pericarpium: the seeds solitary, ovate-oblong, involute, crowned variously with proper calyxes: the receptacles common convex, chaffy, or naked.

The species mostly cultivated are: 1. *S. al-*

pina, Alpine Scabious; 2. *S. leucantha*, Snowy Scabious; 3. *S. succisa*, Devil's-bit Scabious; 4. *S. integrifolia*, Red-flowered Annual Scabious; 5. *S. tatarica*, Giant Scabious; 6. *S. gramuntia*, Cut-leaved Scabious; 7. *S. stellata*, Starry Scabious; 8. *S. atropurpurea*, Sweet Scabious; 9. *S. argentea*, Silvery Scabious; 10. *S. graminifolia*, Grass-leaved Scabious; 11. *S. Africana*, African Scabious; 12. *S. Cretica*, Cretan Scabious.

The first has a perennial root, composed of many strong fibres which run deep in the ground: the stems several, strong, channelled, upwards of four feet high: the leaflets four or five pairs, unequal in size and irregularly placed, ending in acute points: the flowers are on naked peduncles at the ends of the branches, of a whitish yellow colour, appearing at the end of June. It is a native of the Alps of Switzerland, &c.

The second species has a perennial root: the lower leaves almost entire, serrate: stem stiff, two feet high, bifid at top, spreading; in the division arises a naked peduncle, which, as also the divisions, are each terminated by a single flower, composed of many white florets. It is a native of the South of France, &c.

The third has also a perennial, oblong, blackish root, near the thickness of the little finger, often growing obliquely, stumped at the lower end so as to appear as if bitten off, whence its trivial name, and furnished with long whitish fibres: the stem from a foot to eighteen inches in height, upright, branched at top, round, rough with hair, and often of a reddish colour: the branches are lengthened out, and each bears one flower: the root-leaves are ovate, quite entire, blunter than the others; the stem-leaves lanceolate, the lower ones remotely toothed, but the upper ones entire; all dark-green, rather coriaceous, harsh and hairy: the flowers in nearly globular heads. It is a native of Europe, flowering from August to the end of October.

The fourth species has an annual root: the stem is not hispid: the branches patulous: the root-leaves, like those of the Daisy, ovate, bluntish, rugged, more acutely serrate; stem-leaves few; branch-leaves lanceolate, embracing, ciliate at the base, seldom toothed or pinnatifid, very long. It is a native of Germany, flowering from June to August.

The fifth rises with a strong branching stalk four or five feet high, closely armed with stiff prickly hairs; lower hairs spear-shaped, about seven inches long, and near four broad in the middle, deeply cut on the sides; the stem-leaves more entire, some of them sharply serrate; those at the top linear and entire: the

flowers from the sides and at the top of the stalks, white, and each sitting in a bristly calyx: the root is biennial. It is a native of Tarry, &c.

The sixth species has the root-leaves villose, ash-coloured, deeply pinnatifid; with the pinules blunt, distinct, the lower ones linear and entire, the upper gradually wider, blunt, gash-toothed: the stem-leaves bipinnate, with the leaflets linear, narrow, unequal, scarcely pubescent: the stem a foot and half in height: it flowers very late, even in November, and is perennial. It is a native of the South of France, &c.

The seventh is annual, the stems three feet high, hairy: the leaves oblong, deeply notched; the upper ones cut almost to the midrib into fine segments: the flowers on long peduncles: the receptacles are globular: the florets large, spreading open like a star, of a pale purple colour. It is a native of Spain and Barbary, flowering in July and August.

It varies with different jagged leaves, and with red and white flowers.

The eighth species has a fibrous annual biennial root, crowned with a large tuft of oblong leaves, variously jagged and cut on the edges: the stems upright, numerous branched on every side, three feet high or more: the calyx is twelve-leaved, recurved, linear, the length of the corolla: the flower very dark purple, with white anthers: the fruit ovate: the receptacle subulate, with bristle-shaped chaffs. It flowers from June to October: the flowers are very sweet, and there is a great variety in their colour, some being of a purple approaching to black, others of a pale purple, some red and others variegated. It also varies in the leaves, some being finer cut than others: and sometimes from the side of the calyx come out many slender peduncles sustaining small flowers, like the (proliferous or) Hen-and-chicken Daisy.

The ninth is a low perennial plant, with a branching stalk spreading wide on every side; the leaves are of a silvery colour; the flowers are small, pale, and have no scent: the stem has white hairs thinly scattered over it: the root-leaves are somewhat toothed; stem-leaves undivided, and ciliate towards the base. It is a native of the Levant, flowering from June to October.

The tenth species has a perennial root, from which arise three or four stalks, the lower parts of which have linear leaves about four inches long, and the eighth of an inch broad, of a silvery colour, ending in acute points: the upper part of the stalk is naked for six or seven inches in length, and sustains at the top one pale-blue

flower. It is a native of the mountains of Dauphiné, flowering in July.

The eleventh has a weak shrubby stalk, which divides into several branches, and rises about five feet high: the leaves are ovate-lanceolate, three inches long, and an inch and half broad, deeply crenate, of a light green, and a little hairy: the peduncle terminating, sustaining one pale flesh-coloured flower. It is a native of Africa, flowering from July to October: it varies in the leaves. The variety with the leaves finely cut, has, according to Miller, the stalks hairy, and dividing into several branches: the bottom leaves are lanceolate crenate and entire; but those on the upper part of the stalk are bipinnate: the flowers are produced on long naked footstalks from the end of the branches; are of a pale flesh-colour and large, but have no scent.

The twelfth rises with a shrubby stalk three feet high, and divides into several woody knotty branches: the leaves are narrow, silvery, entire, four inches long, and a quarter of an inch broad: the flowers stand upon very long naked peduncles at the end of the branches, and are of a fine blue colour. It is a native of Candia and Sicily. According to Miller, the plant from Candia has shorter and much broader leaves, and not so white as those of the Sicilian; the flowers are not so large, and are of a pale purple colour.

Culture.—All the annual and biennial sorts may be increased by seed, which should be sown in a bed or border of common mould, or in pots to be forwarded in the hot-bed in the early spring months; but the biennial sort is better sown in the latter end of the summer, as about August, as they flower stronger and more fully the following summer. Some may however be sown at both seasons.

When the plants have attained some growth, in the spring-sown sort, they should be pricked out into the places where they are to grow, on beds, to be afterwards removed: and in the autumn-sown sorts into nursery-rows, six or eight inches apart, to be removed into the places where they are to remain, with balls about their roots, in the following spring, being duly watered and kept free from weeds.

The starry sort is best sown in patches in the borders or clumps where the plants are to flower.

The herbaceous perennial kinds may be readily increased by sowing the seeds in a bed or border of good light earth, in the spring season, the plants being planted out when they have attained a little growth where they are to grow: they are also capable of being raised by parting

the roots and planting them out where they are to grow in the autumn.

The shrubby kinds may be readily raised by planting slips or cuttings of the young branches in the spring or summer season, in the former season in pots and plunged in a moderate hot-bed, or under a glass frame; but in the latter, in the open ground, being well shaded and watered. They soon become tolerably well rooted, and in the autumn may be potted off into separate pots filled with light loamy earth, and managed in the same manner as other exotic green-house plants during the winter.

The annual and perennial sorts afford ornament and variety among other plants of the flower kind in the borders, &c., and the shrubby kinds produce variety in green-house collections.

SCALLION. See **ALLIUM.**

SCANDIX, a genus containing plants of the hardy herbaceous annual and perennial kinds.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferae*.

The characters are: that the calyx is an universal umbel, long, with few rays: partial more abundant: involucre universal none: partial five-leaved, length of the umbellet: perianth proper obsolete: the corolla universal difform, radiate: florets of the disk abortive: proper petals five, inflex-emarginate: the inner ones smaller; outmost larger: the stamina have five capillary filaments: anthers roundish: the pistillum is an oblong inferior germ: styles two, awl-shaped, length of the least petal, distant, permanent: stigmas in the radiant florets obtuse: there is no pericarpium: fruit very long awl-shaped, bipartite: the seeds two, awl-shaped, convex and grooved on one side, flat on the other.

The species is *S. cerfolium*, Garden Chervil.

It has an annual root: the leaves are of an exceedingly delicate texture, smooth, shining, tripinnate, with the segments deeply semipinnate, and the lobules lanceolate, shortly two-toothed, or three-toothed: the stem smooth, from a foot to two feet in height, hairy only under the origin of the branches, whence always are produced two branches and a single leaf: the flowers white. It is a native of many parts of Europe, flowering in May. It was formerly much more cultivated than at present. It is used as a culinary plant in winter and spring, and is a native of the Levant.

Culture.—This plant may be raised from seed by sowing at different times in the early spring, as from February to March, and also in August for winter use, in beds of common earth, raking

the seed in : it afterwards only requires to be kept clean from weeds.

The leaves are used in their young state while green and tender.

SCARLET BEAN. See PHASEOLUS.

SCARLET CARDINAL FLOWER. See LOBELIA.

SCARLET CONVULVULUS. See IPO-MEAE.

SCARLET HORSE CHESTNUT. See PAVIA.

SCARLET JASMIN. See BIGNONIA.

SCARLET LUPIN. See LATHYRUS.

SCARLET LYCHNIS. See LYCHNIS.

SCARLET OAK. See QUERCUS.

SCHINUS, a genus affording plants of the shrubby evergreen exotic kinds for the greenhouse and stove.

It belongs to the class and order *Diœcia Decandria*, and ranks in the natural order of *Dumosæ*.

The characters are : that in the male the calyx is a one-leafed, five-parted perianth, spreading, acute : the corolla has five oval petals, spreading, petioled : the stamina have ten filiform filaments, length of the corolla, spreading : anthers roundish : the pistillum a rudiment without a stigma. Female—the calyx is a one-leafed, five-parted perianth, acute, permanent : the corolla has five oblong petals, spreading, petioled : the pistillum is a roundish germ : style none : stigmas three, ovate : the pericarpium is a globular three-celled berry : the seeds solitary, globular.

The species are : 1. *S. molle*, Peruvian Mastick Tree ; 2. *S. Areira*, Brazilian Mastick Tree.

The first rises with a woody stem eight or ten feet high, dividing into many branches, covered with a brown rough bark : the leaves are alternate on the branches, composed of several pairs of leaflets from ten to fifteen, each about an inch and half long, and a quarter of an inch broad at the base, lessening gradually to the point, and having a few serratures on their edges ; they are of a lucid green, and emit a turpentine odour when bruised. The flowers are produced in loose bunches at the end of the branches ; are very small, white, and have no odour. It is a native of Peru.

The second species differs from the first only in having the leaflets entire and all equal in size. It is a native of Brazil and Peru.

Culture.—The first is increased by sowing seeds obtained from its native situation in pots filled with fresh mould, plunging them in a moderate hot-bed ; fresh air and water should be frequently given, when in five or six weeks the

plants will be fit to plant out in separate small pots filled with soft loamy mould, re-plunging them in the hot-bed, and giving proper shade till they are fresh rooted. They should afterwards be gradually inured to the open air during the summer season, being taken under shelter before the frosts commence.

They are tender while young, requiring a little warmth in winter, but the protection of the greenhouse will be sufficient afterwards.

It is also capable of being increased by layers and cuttings ; the former may be laid down in the spring, and the later planted out in the early spring ; the plants when well rooted being treated as the seedlings.

The second sort may be increased in the same method ; but the plants require to be continued in the stove for several winters, when they may be preserved in a moderate greenhouse.

They afford variety among other exotic plants in greenhouse collections.

SCILLA, a genus containing plants of the hardy, bulbous-rooted, perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronarieæ*.

The characters are : that there is no calyx : the corolla has six ovate petals, spreading very much, deciduous : the stamina have six awl-shaped filaments, shorter by half than the corolla : anthers oblong, incumbent : the pistillum is a roundish germ : style simple, length of the stamens, deciduous : stigma simple : the pericarpium is a subovate capsule, smooth, three-grooved, three-celled, three-valved : the seeds many, roundish.

The species are : 1. *S. maritima*, Officinal Squill ; 2. *S. Lilio-Hyacinthus*, Lily-rooted Squill ; 3. *S. Italica*, Italian Squill ; 4. *S. Peruviana*, Peruvian Squill ; 5. *S. amœna*, Nodding Squill ; 6. *S. campanulata*, Spanish Squill ; 7. *S. autumnalis*, Autumnal Squill.

The first has a very large root, somewhat pear-shaped, composed of many coats as in the Onion, and having several fibres coming out at the bottom, and striking deep in the ground. From the middle of the root arise several shining leaves, a foot long, and two inches broad at their base, lessening all the way to the top, where they end in points ; they continue green all the winter, and decay in the spring : then the flower-stalk comes out, rising two feet high, naked about half way, and terminated by a pyramidal thyrse of flowers, which are white. It is a native of Spain, Portugal, &c. flowering here in April and May.

There are varieties with a red, and with a white root.

The second species has a scaly root like the Lily; it is oblong and yellow, very like that of Martagon: the leaves are shaped like those of the White Lily, but are smaller: the stalk is slender, and rises a foot high; it is terminated by blue flowers, which appear in June. It is a native of Spain, Portugal, &c.

The third has a roundish solid bulb, like that of the hyacinth: the leaves come out sparsely, and are very like those of the English hare-bells: the stem seven or eight inches high, terminated by clustered flowers of a pale blue colour; at first disposed in a sort of umbel or depressed spike, but afterwards drawing up to a point and forming a conical corymb.

The fourth species has a large solid root, raised a little pyramidal in the middle, covered with a brown coat, from this come out before winter five or seven leaves, six or eight inches long, of a lucid green, keeled, and spreading almost flat on the ground: from the centre of these come out one, two, or three scapes, thick, succulent, six or eight inches high, terminated by a conical corymb of flowers, upon pretty long pedicels.

There are varieties with a deep blue, and with a white flower; it is often known by the name of Hyacinth of Peru. It is a native of Spain, Portugal, and Barbary.

The fifth has a large solid purplish root, from which come out five or six leaves, lying on the ground, above a foot long, and an inch broad, keeled, channelled, and of a lucid green; from among these arise two, three, or four purplish stalks, eight or nine inches high, sustaining towards the top five or six flowers, which come out singly from the side; they are of a violet-blue colour, and appear in April. It is a native of the Levant.

In the sixth species the bulb is oblong, white, whence come out five or six leaves, a foot long, and half an inch broad, of a lucid green, and a little keeled: scape nine or ten inches high, firm, and sustaining many flowers at the top, disposed in a loose panicle, each on a pretty long pedicel which is erect, but the flower itself nods: the corolla is of a deep blue violet colour. It is a native of Spain and Portugal, flowering in May.

The seventh has the bulb ovate-roundish, coated, whitish: the leaves numerous, much shorter than the scape, two or three inches long, linear, obtuse, channelled, spreading, scape from three or four to six inches in height, round, upright, striated, below whitish green, above purplish; appearing villose when magnified. Sometimes there is a second scape: the flowers six, ten, or even twenty in a corymb, which is

soon lengthened out into a raceme. It is a native of France, Spain, &c.

It is observed that "most old writers distinguish a larger and a smaller sort; but these differ merely in size: and some have noticed a variety with white flowers."

Culture.—These plants may be increased by offsets from the roots, and by seeds, but the first is the better mode.

The offsets may be taken off every other year, and be planted out at the time the leaves and stems decay.

The seed should be sown in the autumn, on light mould in shallow boxes or pans, in the same manner as in the Hyacinth, the same circumstances being attended to in the culture. The plants are long in flowering in this way, except in the last species, which should have a dry loamy soil.

The first sort, as being a native of the sea-shores, cannot be well propagated in other situations, as the plants are apt to be destroyed by the frosts in winter, and to grow indifferently in the summer season from the want of salt water.

They afford variety in the beds and borders of pleasure-grounds.

SCORPION SENNA. See CORONILLA.

SCORPIURUS, a genus containing hardy herbaceous plants of the annual kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a simple umbel: perianth one-leafed, erect, inflated, very slightly compressed, half-five-cleft, acute: teeth almost equal: the upper ones less divided: the corolla papilionaceous: banner roundish, emarginate, reflexed, spreading: wings sub-ovate, loose, with a blunt appendix: keel half-mooned, with the belly gibbous, acuminate, erect, two-parted below: the stamina have diadelphous filaments, (simple and nine-cleft,) ascending: anthers small: the pistillum is an oblong germ, cylindrical, a little reflexed: style bent-in upwards: stigma a terminating point: the pericarpium is an oblong legume, subcylindrical, coriaceous, striated, rugged, revolute, divided internally into several transverse cells, obscurely knobbed externally by the contraction of the joints: the seeds are solitary, roundish.

The species cultivated are: 1. *S. vermiculata*, Common Caterpillar; 2. *S. muricata*, Two-flowered Caterpillar; 3. *S. sulcata*, Furrowed Caterpillar.

The first has the stalks herbaceous, trailing, above a foot long, lying on the ground, and having at each joint a spatulate leaf on a long footstalk: the peduncles axillary, sustaining at the top one

yellow flower, which is succeeded by a thick twisted pod, the size and appearance of a large green caterpillar. It is a native of the South of Europe.

The second species has stronger stalks than the first; the leaves are much broader; the peduncles support two smaller flowers; the pods are slender, longer and more twisted, and are armed with blunt spines on their outside. It is a native of the South of Europe.

The third has slenderer stalks than either of the former; the leaves stand upon shorter foot-stalks, but are shaped like those of the first sort; the peduncles are slender, and frequently support three flowers; the pods are slender, not so much twisted as the former, and armed on their outside with sharp distinct spines. It is a native of the South of Europe, and Barbary.

Culture.—These plants may be increased by sowing the seeds in the places where they are to remain in the early spring months, three or four seeds being put in, in a place, the plants should be thinned properly and kept clean from weeds afterwards, when they will produce flowers, and pods having the resemblance of caterpillars, about the month of June.

The first sort is the most deserving of cultivation, as being the largest in the pods and most perfectly formed.

They afford ornament and variety in their curious pods.

SCORZONERA, a genus containing a plant of the tap-rooted esculent kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Semiflosculosæ*.

The characters are: that the calyx is common, imbricate, long, subcylindrical: scales about fifteen, scariosc at the edge: the corolla compound, imbricate, reniform: corollæ hermaphrodite numerous, the outer a little longer: proper one-petalled, ligulate, linear, truncate, five-toothed: the stamens have five capillary filaments, very short: anther cylindrical, tubular: the pistillum is an oblong germ: style filiform, length of the stamens: stigmas two, reflexed: there is no pericarpium: calyx ovate-oblong, converging and finally spreading and reflexed: the seeds solitary, oblong, cylindrical, striated, shorter by half than the calyx: pappus feathered, sessile, with chaffy and bristly rays mixed: the receptacle naked.

The species cultivated is *S. Hispanica*, Garden Viper's-grass, or Spanish Scorzonera.

It has a carrot-shaped root, about the thickness of a finger, and covered with a dark brown skin; it is white within, and has a milky juice: the lower leaves nine or ten inches long, and an

inch and half broad in the middle, ending with a long acute point: the stalk three feet high, smooth, branching at top, and having on it a few narrow embracing leaves: the flowers are bright yellow. It is a native of Spain, the South of France, &c.

It is cultivated for the root, which is boiled and eaten as carrots, or it may be tried in batter, which is probably the better way of using it. They are ready for use in the autumn and winter season.

Culture.—These crops should be raised from seed sown either in the autumn or spring season, about April, in an open spot of ground where the soil is light and fine. The best mode of sowing them is in shallow drills, about a foot apart, in a thin manner, covering them in to the depth of half an inch: the plants, when of some growth, should be thinned out when they are too thick, to the distance of six or eight inches, keeping them clean from weeds by hoeing.

Some also raise them by sowing the seed broadcast over the surface, and afterwards thinning the plants or transplanting them into other beds; but the first is the most successful method, and transplanting should never be practised with tap-rooted plants.

The roots may be taken up in the autumn, and preserved in the same manner as those of carrots; but they are sometimes left in the ground to be pulled as they are made use of.

In order to save seed, some of the best plants should be left where sown, to run to seed, which, when perfectly ripened, should be collected and preserved in a dry situation till wanted.

SCOTCH FIR. See **PINUS**.

SCREW-PINE. See **PANDANUS**.

SCREW-TREE. See **HELICTERES**.

SCROPHULARIA, a genus comprising plants of the fibrous-rooted, herbaceous, and shrubby kinds.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved perianth, five-cleft, permanent: segments shorter than the corolla, rounded: the corolla one-petalled, unequal: tube globular, larger, inflated: border five-parted, very small: segments, the two upper larger, erect; two lateral, spreading a little; one lowest, bent back: the stamens have four linear filaments, declining, length of the corolla; of which two are later: anthers twin: the pistillum is an ovate germ: style simple, situation and length of the stamens: stigma simple: the pericarpium is a roundish capsule, acuminate, two-celled, two-valved: partition folded, constructed of the margins of

the valves bent in; opening at the top: the seeds very many, small: the receptacle roundish, insinuating itself into each cell.

The species cultivated are: 1. *S. frutescens*, Shrubby Figwort; 2. *S. trifoliata*, Three-leaved Figwort; 3. *S. sambucifolia*, Elder-leaved Figwort; 4. *S. lucida*, Shining-leaved Figwort.

The first has the stem perennial, (or becoming woody,) four-cornered, acute-angled, brachiate below: the leaves ovate, toothed, shining, smooth, small, opposite: the lower obovate; the upper oblong: the raceme terminating, leafy, with quite entire bracts, and opposite trifid peduncles, the length of the bracts: corollas small, very dark purple, with the lateral segments white, and the lowest very small. A native of Portugal.

The second species has the stem simple or sparingly branched, erect, smooth, four-cornered, striated: the leaves cordate, smooth and even, shining, veined, obtuse, unequally and obtusely double-toothed, petioled; the lower ones often eared at the base: the raceme interrupted: the peduncles alternate: the flowers pedicelled, in racemelets. According to Plukenet, they are beautifully variegated with red and yellow. It is a native of Corsica and Africa, and is biennial or perennial.

In the third the stem is erect, four-cornered from the decurrent petioles: the leaves pinnate, with five or seven leaflets, (besides the smaller ones placed between them) cordate, wrinkled, smooth above, serrate, with the end one larger: the raceme terminating, composed of very short, subdichotomous, axillary peduncles in pairs: flowers large, purple with the lower lip greenish. It is a native of Portugal, flowering from July to September, and perennial.

The fourth species, according to Miller, is a biennial plant, with stalks fifteen inches high, thick, smooth, and having scarcely any corners: leaves pinnate, narrow, of a lucid green, thick, succulent, and divided into many leaflets, which are again divided (bipinnate): flowers in loose bunches on the sides and at the top of the stalk, of a dark brown colour with a mixture of green. It is a native of the kingdom of Naples.

Culture.—These plants may be increased by seeds, which should be sown in autumn in the borders or other places where the plants are to remain. The plants should be kept free from weeds; when the roots continue several years, unless destroyed by severe frosts. It is therefore a good practice to have some in pots protected by a frame and glasses: and as the young plants flower the strongest, a proper succession should be sown annually. They may also be sometimes raised from the parted roots; and the shrubby sorts by cuttings in the summer.

They afford ornament in the clumps, &c.

VOL. II.

SCULL-CAP. See SCUTELLARIA.

SCUTELLARIA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Ferticillatæ*.

The characters are: that the calyx is a one-leaved perianth, very short, tubular: mouth almost entire; after flowering closed with a lid: the corolla one-petalled, ringent: tube very short, bent backwards: throat long, compressed: upper lip concave, trifid; middle little segment concave, emarginate; side ones flat, sharpish, lying under the middle one; lower lip wider, emarginate: the stamens have four filaments, concealed beneath the upper lip, of which two are longer: anthers small: the pistillum is a four-parted germ: style filiform, situation and length of the stamens: stigma simple, curved in, acuminate: there is no pericarpium: calyx closed by a lid, helmet-shaped, doing the office of a capsule, three-sided, opening by the lower margin: the seeds four, roundish.

The species are: 1. *S. integrifolia*, Entire-leaved Skull-cap; 2. *S. peregrina*, Florentine Skull-cap; 3. *S. altissima*, Tall Skull-cap.

The first has the stems two feet high, sending out many side branches: the lower leaves heart-shaped and serrate, standing upon pretty long foot-stalks; upper leaves ovate and entire: the flowers in very long loose spikes at the end of the branches; they are of a purple colour, and appear at the end of June. It is a native of North America.

The second species has the stem hairy, two feet high: the flowers are purple or white. It is a native of Italy, &c.

The third has the stems three or four feet high, sending out a few slender branches: the flowers are purple, with longer tubes than those of any of the other sorts. It is a native of the Levant.

Culture.—These are all raised from seed, which should be sown in the autumn or spring, but the former is the better season, in the places where they are to remain, or in a border to be removed afterwards. When the plants are up they should be properly thinned out and kept free from weeds.

They afford variety in the borders, clumps, and other parts of pleasure-grounds.

SEA CABBAGE. See BRASSICA and CRAMBE.

SEA DAFFODIL. See PANCRACTIUM.

SEA GRAPE. See COCCOLOBA.

SEA HOLLY. See ERYNGIUM.

SEA LAUREL. See PHYLLANTHUS.

SEA ONION. See SCILLA.

SEA PEA. See PISUM.

SEA PINK. See CERASTIUM.

SEA PURSLANE. See ATRIPLEX.

SEA-SIDE GRAPE. See COCCOLOBA.

SEA LAUREL. See XYLOPHYLLA.

SEA PIGEON-PEA. See SOPHORA.

SEAL, SOLOMON'S. See CONVALLARIA.

SEDUM, a genus containing plants of the hardy herbaceous succulent kind.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a five-cleft perianth, acute, erect, permanent: the corolla has five petals, lanceolate, acuminate, flat, spreading: nectaries five; each a very small emarginate scale, inserted into each germ at the base on the outside: the stamens have ten awl-shaped filaments, length of the corolla: anthers roundish: the pistillum has five oblong germs, ending in more slender styles: stigmas obtuse: the pericarpium five capsules, spreading, acuminate, compressed, emarginate towards the base, opening on the inside longitudinally by a suture: the seeds numerous, very small.

The species cultivated are: 1. *S. Telephium*, Orpine Stonecrop; 2. *S. Anacampteros*, Evergreen Orpine; 3. *S. Aizoon*, Yellow Stonecrop; 4. *S. populifolium*, Poplar-leaved Stonecrop; 5. *S. stellatum*, Starry Stonecrop; 6. *S. Cepaea*, Purslane-leaved Stonecrop; 7. *S. dasycyllum*, Thick-leaved Stonecrop; 8. *S. reflexum*, Yellow Stonecrop; 9. *S. rupestre*, Rock Stonecrop; 10. *S. Hispanicum*, Spanish Stonecrop; 11. *S. album*, White Stonecrop; 12. *S. acre*, Biting Stonecrop, or Wall Pepper; 13. *S. saxangulare*, Insipid Stonecrop; 14. *S. Anglicum*, English or Mild White Stonecrop; 15. *S. annuum*, Annual Stonecrop.

The first has a perennial tuberous root: the stems from one to two feet high and upwards, upright, simple or unbranched, leafy, round, smooth, solid, reddish and often dotted with red: the leaves almost covering the stem, sessile, ovate, fleshy, tooth-serrate, smooth and even, of a blueish green colour: the corymbs terminating, many-flowered, close or heaped together: the flowers deep purple, very rarely white in this climate, though that seems to be the most common colour in some foreign countries. It is a native of Portugal.

There are several varieties, as with purple flowers, with white flowers, with broad leaves, and the Greater Orpine.

The second species has fibrous perennial roots: the stems trailing: the leaves standing alternate round the stems, almost an inch long, and half an inch broad: the flowers in a compact corymb, sitting close on the top of the stem: they are star-shaped, of a purple colour,

and appear in July. It is an evergreen; and a native of Germany.

The third has a perennial root, composed of many thick fleshy fibres, from which come out several stalks rising near a foot high: the leaves are alternate on every side, thick, two inches and a half long, and three quarters of an inch broad, and slightly serrate: the flowers bright yellow. It is a native of Siberia, flowering from July to September.

The fourth species has the leaves cordate, thick and fleshy: the stem herbaceous, branched, erect, patulous, even, a foot high: the leaves alternate, remote, only at the ramifications, blunt, fleshy, smooth. When it grows in an open situation, exposed to the sun, the leaves and stalks become of a bright red colour. It is a native of Siberia, and the only hardy *Sedum* cultivated with us that has a shrubby stalk: the leaves are deciduous. It flowers in July and August, and is proper for a rock plant.

The fifth is a low annual plant: the stalks rise three inches high, dividing at top into two or three parts: the flowers come out singly from the side of the stalk; are white, star-pointed, and succeeded by star-pointed rough capsules. It is a native of Germany, &c.

The sixth species has also an annual root: the stalks six or seven inches high, dividing into smaller branches, which sustain small white flowers growing in large panicles. It is a native of Germany, France, &c.

There is a variety which has the stem more erect, and the lower leaves in threes or fours, the next opposite, and the uppermost alternate.

The seventh has a perennial (biennial) root, composed of small white fibres: the stems numerous, weak, prostrate and creeping, about three inches long or somewhat more, branched, in tufts, round, weak, clammy, leafy: the flowering branches erect: the leaves mostly opposite, closely imbricate, sessile, very thick and fleshy, broader than long, convex on the lower, nearly plane on the upper surface, glaucous often with a tinge of purple; dotted and sometimes having a net of red veins: on the flowering branches they are alternate. It is a native of many parts of Europe, as France, &c.

When introduced into a garden, it propagates itself freely upon walls, in waste places, and about garden pots; and no plant is better adapted to the purpose of decorating rock-work, as it grows without any trouble, in any aspect, multiplying very much by young shoots, and always looks beautiful.

The eighth species has also a perennial root: the stems round, leafy, branched at the base, often hanging down, erect at the top; the leaves scattered, alternate, adnate-sessile, loose at the



Painted by Syd Edwards

London Published Nov 1st 1805 by G Kearsley Fleet Street

Engraved by F. Sanfen

Sedum Anacampseros
 1 Evergreen Orpine

Sophora Tetraptera
 2 Winged-Podded Sophora

base and produced, erect above, compressed, acuminate, extremely succulent, smooth, rather glaucous, frequently tinged with red; the lower ones turned back; when old they easily fall off: the flowers are in a terminating subcymed panicle, with many-flowered branches, for the most part recurved; the flowers erect, bright yellow. It is a native of Europe, and is common here on walls and thatched roofs, and rocks in the northern counties, flowering in July.

The ninth is a little smaller than the eighth: the leaves closely imbricate (before flowering) in five or six rows, glaucous, flattened a little, acuminate; on the flowering stem somewhat remote, as in that sort, all erect, not bent back at the point. According to Withering, the disposition of the leaves in five or six rows may be best observed by viewing the plant with the ends of the branches opposed to the eye: the panicle subcymed, many-flowered, with the branchlets scarcely reflexed: the flowers of a bright yellow or gold colour, often six-cleft. It is a native of England and Wales, &c., perennial, flowering in July.

This, as well as the above, is cultivated in Holland and Germany to mix with lettuces in salads.

The tenth has a slender, fibrous, perennial root: the stems several, a hand high, reclining at the base, and then erect, round, tinged with red: the leaves, on the flowering stems, pale green dotted with purple, oblong, thickish, round on one side and flat on the other; towards the top, under the flowers, more swelling and shorter: leaves on young plants or barren shoots, in bundles, glaucous, without any purple dots, thinner, from a narrow base widening gradually, and ending in a blunt point: the stems divide at top into a few branchlets, forming a sort of umbel, (or rather cyme,) bearing sessile, star-like white flowers, stained with pale purple from a purple groove running along the petals: these are six, sometimes seven in number, keeled and cusped. It is a native of Spain and Carinthia, flowering in July.

The eleventh species has a perennial, fibrous root: the stems decumbent at bottom, and there throwing out fibres; flowering stems upright, from three inches to a span in height, round, leafy, branched, smooth: the leaves scattered thinly, spreading out horizontally, sessile, cylindrical, very blunt, smooth, fleshy, somewhat glaucous and generally reddish: panicle terminating, alternately branched, subcymose, many-flowered, smooth. It is a native of Europe, on rocks, walls and roofs, flowering in July.

It is eaten by some as a pickle.

The twelfth has also a perennial, fibrous root: the stems numerous, growing in tufts, much

branched, decumbent, and creeping at the base, then upright, three inches high, smooth, round, very leafy: the leaves closely imbricate, blunt, flattened a little, from upright spreading, loose at the base: the cymes terminating, solitary, few-flowered: the flowers erect, sessile. It is a native of Europe, flowering in July.

The thirteenth species has the habit of the preceding sort, but is somewhat larger: the leaves are subcylindrical; not ovate, and come out mostly by threes in a double row, and hence appear to be imbricate in six rows; this is most obvious in the young shoots: they are very spreading, loose at the base, and scarcely gibbous: the cyme is leafy: the flowers of a golden yellow colour. It is not acrid. It is a native of many parts of Europe, flowering at the end of June.

The fourteenth has an annual, fibrous root: the stems in tufts, decumbent at the base, smooth, red, leafy: the leaves mostly alternate or nearly opposite, bluntish, somewhat glaucous, produced and loose at the base: the cymes terminating, solitary, almost leafless, racemed: the flowers erect, five-cleft. It is a native of Britain and Norway.

The fifteenth species is also an annual plant, with an erect stalk, seldom rising above two or three inches high: the leaves are of a grayish colour: the flowers are small and white, and grow at the top of the stalk, in a reflexed spike. It is a native of the North of Europe.

Culture.—These plants are all raised without much difficulty, by proper care and attention to have the soil dry and of the poor sandy kind.

Culture in the Orpine sorts.—These may all be readily increased by planting cuttings, during the summer months, in light mould in a shady situation, or in pots placed in similar situations. The plants in the open ground, as well as those in pots, should be kept clean from weeds, and be watered frequently when the weather is dry.

They may likewise be raised by parting the roots, and planting them in a similar manner in the spring or autumn. When the plants are once well established, they spread rapidly, and require little or no care.

Culture in the Stonecrop kind.—These are raised without much trouble, by planting out their trailing stalks in the spring or summer season, which readily take root. They thrive most perfectly on old walls, buildings, or rock-works. Where cuttings or roots of the perennial kinds are planted in some soft mud, placed upon such situations, they quickly take root and spread into the different joints and crevices, covering the whole in a very short time.

The seeds of the annual sorts also, when sown

soon after they become ripe in such situations, soon come up and support themselves without further trouble.

Most of the perennial sorts are kept in the nurseries in full plants, fit for setting out in the borders, pots, &c. either in the spring for flowering the same year, or in the autumn to flower in the following year.

These plants may be planted out in any dryish light soil, in borders, beds, and other places, and in the sides of dry banks, or in any elevated rubbishy soil, as well as in pots to move to different parts occasionally; or also some of the evergreen kinds, to introduce in their pots among winter plants under shelter, to increase the variety. In most sorts, they may also be introduced as rock plants, to embellish artificial rock-works, ruins, and other similar places in pleasure-grounds. The Stonecrops and other low trailing kinds may also be made to occupy the tops of any low walls, pent-houses, sheds, or other low buildings.

The twelfth and thirteenth sorts may likewise be disposed in patches towards the fronts of borders, &c. as they spread thick and tufty close to the ground, and flower abundantly; and being planted in pots, are proper to place in the outside of windows, copings of low walls, and in balconies, and court yards, in assemblage with other low fancy plants; they will closely over-spread the surface, and flower profusely as far as they extend.

SELAGO, a genus furnishing plants of the shrubby and under-shrubby kinds.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Aggregateæ*.

The characters are: that the calyx is a one-leaved, four-cleft perianth, (five-cleft,) small, permanent: lower segment larger: the corolla one-petalled: tube very small, filiform, scarcely perforated: border spreading, five-parted, almost equal; the two upper segments smaller; the lowest larger: the stamina have four capillary filaments, length of the corolla, into which they are inserted; the two upper ones longer: anthers simple: the pistillum is a roundish germ: style simple, length of the stamens: stigma simple, acute: there is no pericarpium: corolla (calyx) involving the seed: the seed one or two, roundish.

The species cultivated are: 1. *S. corymbosa*, Fine-leaved Selago; 2. *S. spuria*, Linear-leaved Selago; 3. *S. ovata*, Ovate-headed Selago.

The first has slender woody stems, rising seven or eight feet high, but so weak as to require support; they send out many slender branches: the leaves are short, linear, hairy, coming out in clusters: the flowers small, and

of a pure white; appearing in July and August, but not followed by seeds in this climate.

The second species has a suffruticose stem: the leaves alternate, clustered: the spikes ovate-oblong, blunt, closely imbricate; with oblong, membranaceous bractes: the corollas five-cleft, violet; with a long filiform tube: the capsule six-valved. It is biennial, flowering in June.

The third has white flowers, with a yellow spot on the two uppermost segments, and sometimes on all of them, and an orange spot at the mouth of the tube. It is valuable not so much on account of its beauty, as the curious structure of its spikes, and the fragrance of its flowers. It flowers in June and July, and as well as the rest it is a native of the Cape.

Culture.—They may be increased by cuttings and layers. The cuttings should be made from the young under shoots, and be planted out during the summer months in a bed of fresh earth, covering them close with a bell- or hand-glass, shading them from the sun, and refreshing them now and then with water. They should be gradually hardened, and then transplanted into small pots, placing them in the shade till they have taken root. The layers may be laid down in the autumn or spring, and when well rooted be taken off and planted out in pots, as above. The plants should afterwards be placed out with other hardy greenhouse plants, and about the end of October removed into the dry stove. They only require protection from frost, being treated in the same manner with the hardier sort of greenhouse plants.

They afford ornament and variety in greenhouse collections.

SEMPERVIVUM, a genus containing plants of the succulent, hardy, herbaceous, evergreen, and shrubby perennial kinds.

It belongs to the class and order *Dodecandria Polygynia*, (Dodecagynia,) and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a six- to twelve-parted perianth, concave, acute, permanent: the corolla has six to twelve petals, oblong, lanceolate, acute, concave, a little bigger than the calyx; the stamina have from six to twelve filaments (or more), subulate-slender: anthers roundish: the pistillum from six to twelve germs, in a ring, erect; ending in as many spreading styles: stigmas acute.

The species cultivated are: 1. *S. tectorum*, Common Houseleek; 2. *S. globiferum*, Globular Houseleek; 3. *S. arachnoideum*, Cobweb Houseleek; 4. *S. montanum*, Mountain Houseleek; 5. *S. arboreum*, Tree Houseleek; 6. *S. Canariense*, Canary Houseleek.

The first has a perennial fibrous root: the root-leaves in form of a full-blown double-rose,



Painted by S. Edwards

London Published Aug^r 1806 by G. Kearsley Fleet Street

Engraved by F. Sauton

1. *Sempervivum arachnoideum*
Cobweb Houseleek.2. *Strelitzia regina*
Canna leaved Strelitzia.

sessile, wedge-shaped or obovate, somewhat more than an inch long, very fleshy, thick, flat above, a little convex beneath, keeled and whitish, smooth on both sides, the edges fringed with hairs and generally tinged with red, pointed, upright, gradually smaller inwards: offsets on long footstalks, globular, the size of a pigeon's egg or larger, composed of erect leaves lying over each other: the flowering-stem upright, from nine inches to a foot in height, round, fleshy, pubescent, having alternate, lanceolate, thinner leaves on it, of a reddish colour, at top branched and forming a sort of corymb; the branches spreading and bending back: the flowers numerous, clustered, upright, pubescent, flesh-coloured, all growing one way. It is a native of Europe, flowering in July.

The second species has the leaves much narrower, and the heads furnished with a greater number of them than those of the first sort, which grow more compact, and are closely set on their edges with hairs: the offsets are globular, their leaves turning inward at the top, and lying close over each other; these are thrown off from between the larger heads, and, falling on the ground, take root, whereby it propagates very fast: the flower-stalks are smaller, and do not rise so high as those of the former; and the flowers are of a paler colour. It is a native of Russia, Austria, &c. flowering in June and July.

The third has much shorter and narrower leaves than the first: the heads are small and very compact: the leaves are gray, sharp-pointed, and have slender white threads crossing from one to the other, intersecting each other in various manners, so as in some measure to resemble a spider's web: the flower-stalks about six inches high, succulent and round, having awl-shaped succulent leaves placed on them alternately: the upper part divides into two or three branches, upon each of which is a single row of flowers ranged on one side; each composed of eight lanceolate petals, of a bright red colour, with a deep-red line running along the middle; they spread open in form of a star. It is a native of Switzerland and Italy, flowering in June and July.

The fourth species greatly resembles the first, but the leaves are smaller, and have no indentures on their edges: the offsets spread out from the side of the older heads, and their leaves are more open and expanded: the flower-stalk is nine or ten inches high, having some narrow leaves below; the upper part is divided into three or four branches, closely set with deep-red flowers composed of twelve petals, and twenty-four stamens with purple anthers. It is a native of Germany, &c. flowering in June and July.

The fifth rises with a fleshy smooth stalk eight or ten feet high, dividing into many branches, which are terminated by round heads or clusters of leaves lying over each other like the petals of a double rose, succulent, of a bright green, and having very small indentures on their edges: the stalks are marked with the vestiges of the fallen leaves, and have a light brown bark: the flower-stalks rise from the centre of these heads; and the numerous bright-yellow flowers form a large pyramidal spike, or thyse. It is a native of Portugal, &c. flowers through the winter, commonly from December to March.

The sixth species seldom rises above a foot and a half high, unless the plants are drawn up by tender management: the stalk is thick and rugged, chiefly occasioned by the vestiges of decayed leaves: at the top is a very large crown of leaves, disposed circularly like a full-blown rose, large, succulent, soft to the touch, and pliable, ending in obtuse points which are a little incurved: the flower-stalk comes out from the centre, and rises near two feet high, branching out from the bottom, so as to form a regular pyramid of flowers, which are of an herbaceous colour. It is a native of the Canary Islands, flowering in June and July.

A variety of this with variegated leaves was obtained from a branch accidentally broken from a plant of the plain sort, at Badmington, the seat of the Duke of Beaufort.

Culture.—The different herbaceous sorts are all capable of being increased without difficulty by planting their off-set heads, which should be slipped with a few root fibres to them, and planted in the spring season on rubbish rock-works, or other places, or in pots for variety: and the tender green-house sorts may be raised from cuttings of the branches and from seeds; but the first is the better method.

The cuttings should be made from the smaller branches in the early summer months, and be planted out in pots, or a bed of fine earth, in a warm shaded situation: where the cuttings are succulent, they should be laid in a dry place for a few days to heal over the cut part; they should be shaded from the sun; and those in pots lightly watered in dry weather: when they are become well rooted, they should be carefully removed into separate pots of a middle size, being placed in the green-house. Some forward these plants by means of bark hot-beds.

The seeds of the Canary kind should be sown in the autumn or early spring in pots of light mould, placing them in a garden-frame to protect them from frost, having the air freely admitted in mild weather: when the plants are come up, and have a little strength, they should be removed into small pots and placed in the green-house.

The first sorts are ornamental on walls, buildings, and rock-works, as well as in pots; and the last two kinds among other potted greenhouse plants.

SENA. See CASSIA.

SENECIO, a genus containing plants of the herbaceous, annual, and perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common calyced, conical, truncate: scales awl-shaped, very many, parallel in a cylinder contracted above, contiguous, equal, fewer covering the base imbricatewise, the tops mortised: the corolla compound, higher than the calyx: corollets hermaphrodite, tubular, numerous in the disk: females ligulate in the ray, if any present: proper in the hermaphrodites funnel-form: border reflex, five-cleft: in the females, if any, oblong, obscurely three-toothed: the stamens in the hermaphrodites, filaments five, capillary, very small: anther cylindric, tubular: the pistillum in both: germ ovate: style filiform, length of the stamens: stigmas two, oblong, revolute: there is no pericarpium: calyx conical, converging: the seeds in the hermaphrodites solitary, ovate: pappus capillary, long; in the females very like the hermaphrodites: the receptacles naked, flat.

The species cultivated are: 1. *S. hieracifolius*, Hieracium-leaved Groundsel; 2. *S. Pseudo-China*, Chinese Groundsel; 3. *S. hastatus*, Spicewort-leaved Groundsel; 4. *S. elegans*, Elegant Groundsel, or Purple Jacobæa.

The first is an annual plant, with a round, channelled, hairy stalk, rising three feet high: the flowers in a state of terminating umbel, composed of dirty-white florets. It is a native of North America, flowering in August.

The second species has a perennial root, composed of some thick fleshy tubers, sending out many fibres on every side; from which come out some large cut leaves shaped like those of the turnep, but smooth: the flower-stalk slender, a foot and half high, sustaining at the top a few yellow flowers. It is a native of the East Indies.

The third has a herbaceous perennial stalk, branching out at the bottom, and rising about two feet and a half high; having narrow leaves at bottom, seven or eight inches long: the upper leaves are smaller, and embracing; they are very clammy: the upper part of the stalk divides into several very long peduncles, each sustaining one yellow flower. It is a native of the Cape, flowering most part of the summer.

The fourth species is an annual plant, having many herbaceous branching stalks, near three feet high: the flowers are produced in bunches on the top of the stalks; are large, the ray of a

beautiful purple colour, and the disk yellow. It is a native of the Cape, flowering from June to July till the beginning of autumnal frosts.

There are varieties with very double purple, and with equally double white flowers. The former is now chiefly cultivated.

There are many other species that may be cultivated for variety.

Culture.—The first and two last sorts are readily increased by planting cuttings of the branches in pots filled with fine mould in the summer season, shading them till they have taken root; and, as the winter approaches, removing them under the protection of the greenhouse, where they should remain till May, when they may be planted out in the borders or clumps.

They may likewise be raised from seed, which should be sown in the spring in pots, and placed in a gentle hot-bed.

The second sort should be more carefully attended, being raised from off-sets, which should be planted in pots in the spring season, and plunged in the hot-bed of the stove, where the plants should be constantly kept.

The first and two last sorts afford variety in borders, and among potted plants; and the second in stove collections.

SENGREEN. See SAXIFRAGA.

SENN. See CASSIA.

SENN, BLADDER. See COLUTEA.

SENN, SCORPION. See EMERUS.

SENSITIVE PLANT. See MIMOSA.

SERRATULA, a genus containing plants of the tall, hardy, herbaceous, perennial kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Capitatæ*.

The characters are: that the calyx is common oblong, subcylindrical, imbricate, with lanceolate, acute or obtuse, awnless scales: the corolla compound tubulous, uniform: corollets hermaphrodite, equal: proper one-petalled, funnel-form: tube bent in; border ventricose, five-cleft: the stamens have five capillary, very short filaments: anther cylindrical, tubulous: the pistillum is an ovate germ: style filiform, length of the stamens: stigmas two, oblong, reflex: there is no pericarpium: calyx unchanged: the seeds solitary, obovate: pappus sessile, feathered: the receptacle chaffy, flat.

The species cultivated are: 1. *S. Novboracensis*, Long-leaved Saw-wort; 2. *S. præalta*, Tall Saw-wort; 3. *S. glauca*, Glaucous-leaved Saw-wort; 4. *S. squarrosa*, Rough-headed Saw-wort; 5. *S. scariosa*, Ragged-cupped Saw-wort; 6. *S. spicata*, Spiked Saw-wort.

The first has a perennial root: the stalks several, channelled, seven or eight feet high; the leaves from four to five inches long, and one

inch broad in the middle, slightly serrate, downy on their under side, sessile: the upper part of the stalk divides into peduncles, sustaining purple flowers, which appear at the end of July. It is a native of North America.

The second species has a large, perennial, fibrous root: the stem branching, from four to seven or eight feet high: the leaves seven inches long, and an inch and half broad in the middle, ending in acute points, entire, hairy on their under side, sessile: the flowers in loose bunches at the end of the branches: the calyxes oval, composed of few scales terminating in bristles: the flowers are of a pale purple colour. It is a native of Virginia, Carolina, &c.

The third has a perennial root: the stalks six or seven feet high, purple and channelled: the leaves about three inches long, and an inch and half broad in the middle, ending in acute points, stiff, serrate, and of a light green on both sides: the flowers in a loose terminating corymb, purple, with roundish calyxes. It is a native of Maryland, Virginia and Carolina, flowering in October.

The fourth species has a tuberous root, from which comes out a single stalk, rising near three feet high: the leaves stiff, about three inches long, entire, rough to the touch, pale green on both sides: the upper part of the stalk is adorned with purple flowers, having oblong, rough, prickly calyxes, coming out from the side alternately; and the stalk is terminated by one head larger than the others. It is a native of Virginia, flowering in July and August.

The fifth has a large tuberous root, from which comes out one strong channelled stalk, three or four feet high: the leaves frequent, about three inches long, and half an inch broad: the flowers purple, in a long loose spike, coming out from the side upon pretty long blunt peduncles; they have large rough calyxes composed of wedge-shaped scales. The upper flowers blow first, and appear in August.

The sixth species has a tuberous root, from which comes out a single stalk from two to three feet high: the leaves very narrow, smooth, at bottom more than three inches long, but gradually diminishing to the top, sessile, and placed round the stalk without any order: the flowers purple, smaller than in the fourth and fifth sorts, sessile, and forming a long loose spike. It is a native of North America, flowering from August to October.

Culture.—These plants may all be increased by parting the roots and planting them out in the autumn when the stems decay, or in the spring; but the former is the better season. The old plants should not be parted oftener than every third year, and then not too small.

They are likewise all capable of being increased by seeds, when they can be had good, which should be sown in the autumn or early spring, in a border to the east, in slight drills. When the plants are a few inches high, they should be pricked out in nursery-rows to remain till the following autumn, and then planted out where they are to remain.

They afford ornament in the borders, clumps, &c. being planted to the middle or the back parts.

SERVICE TREE. See *SORBUS*.

SHADDOCK. See *CITRUS*.

SHADE, any thing that intervenes to obscure or protect from the rays of the sun. It is effected in various ways in gardening; as by mats, covers, &c.

SHADING OF PLANTS, the art of protecting plants of young and tender growths in seed-beds, &c. from the sun. It is a necessary work on many occasions, in warm, dry, sunny weather in spring and summer, &c. in pricking out various sorts of small young plants from seed-beds into nursery-beds, pots, &c. as well as small cuttings, slips, above-ground off-sets, pipings, &c. as likewise occasionally in transplanting any kind of more advanced plants, flowers, &c. into beds, or pots, in a hot, dry season; and sometimes to seed-beds of particular sorts of small or curious seeds in hot sunny days; also to plants in hot-beds, under frames and glasses, both of young and more advanced growths. It is the most commodiously and effectually performed by garden mats in a sort of awning over the beds, to plants in the full ground, or to those in pots placed close together; or sometimes to seed-beds, either in that way, or by being spread on the surface; in the latter method, being occasionally watered over the mats: or sometimes, in hot dry weather, by some loose straw litter strewn over seed-beds, which by screening the surface from the parching sun, and preserving the moisture in the earth, promotes a more quick, regular, and free germination in the seed; and when the plants are come up, the covering is soon drawn off lightly with a wooden or other rake. To plants under glasses in frames, &c. the occasional shading is effected either by mats spread thinly over the glasses, or sometimes by a little loose, long litter, shaken lightly over them, just during the fierce heat of the sun. In all cases the shade should not be made too thick, so as to darken the plants too much.

In the business of occasional shading, it is in general only to be continued in the warmest time of sunny days, generally longer to plants, cuttings, &c. which have not struck root, than those that are in a growing state; and in common

with all plants in the full ground, or others designed for placing in the open air, where occasional shading is necessary, it should be discontinued on evenings, mornings, and nights, that they may enjoy the benefit of the full fresh air at these times; as also the tender sorts, striking or advancing in growth under glasses, having occasional shading when the sun is powerful, in the warmer part of the day, should remain unshaded before and after that time, that they may receive the necessary beneficial influence of light and air in a proper degree. But in plants, cuttings, slips, &c. that have had occasional shading till they have struck good root, and begin to advance a little in a renewed growth, the shading should be mostly discontinued gradually, especially for those in beds, pots, &c. in the open ground, or others designed for transplantation, or for placing in pots, in the full air for the summer, according to their kinds: but in some small tender plants of slender growth, the occasional shading may probably be necessary in longer continuation, as till they acquire more strength; and to plants remaining all summer in hot-beds, or under frames and glasses, the continuance of occasional moderate shading in hot sunny days will be proper; but in most young plants, cuttings, &c. pricked out or planted as above, and designed for the full ground or open air, not continued under glasses, the having the benefit of occasional shade till well struck, is all they require.

The sorts of plants which require this kind of management are very numerous; but it is constantly mentioned in their culture where necessary.

SHALLOT. See ALLIUM.

SHIFTING OF PLANTS, the business of removing plants in pots from smaller into larger ones, &c. to give them fresh earth or mould. It is necessary occasionally in all plants in pots, to assist them with larger ones according as the advanced growth of the particular sorts renders it proper, and at the same time to supply an additional portion of fresh earth about the root fibres of the plants, to promote their growth; and sometimes for the application of fresh compost, either in part or wholly, from the plants having remained long unremoved, and the old earth in the pots being much decayed, or on account of some defect of growth in the particular plants.

In regard to the necessity of shifting, it is, in some degree, according to the advancing growth of the different sorts of plants: some sorts of a strong free growth require shifting once every year or two; others, more moderate growers, or of more settled growths, once in two or three years; and some large growing kinds, which are advanced to a considerable size, having been occasionally shifted, in their

increasing growth, from smaller into larger pots of different proportionable sizes, and some from large pots into tubs, of still larger dimensions, as large plants of the American aloe, orange and lemon tree kinds, &c. in that advanced state sometimes only need occasional shifting once in three or several years, especially when the pots or tubs are capacious, containing a large supply of earth, and are occasionally refreshed with some new compost at top, and a little way down round the sides about the extreme roots. And in some small slow-growing plants, as in many of the succulent tribe, shifting them once in two or three years may be sufficient: other sorts want shifting annually into larger pots, according as they advance in a free growth, as the hardy and tender kinds of herbaceous and shrubby plants, &c. And some of the tender annual flower-plants, cultivated in pots, and forwarded in hot-beds, being planted first in small pots, want shifting, in their increasing growth, into larger sizes, once or twice the same season, as from April to the beginning of June, when being shifted finally into the requisite full-sized pots, they remain during their existence.

But though large-grown plants, either of the shrub or tree kind, as well as other plants of large growths, after being finally stationed in the fullest sized large pots and tubs, succeed several years without shifting, they should in the interval have the top earth loosened, and down round the sides to some little depth, removing the loosened old soil, and filling up the pots, tubs, &c. with fresh earth, settling it close by a moderate watering.

The usual season for occasional shifting such plants as require it, is principally the spring and autumn, as from March to May for the spring shifting; and from August to the end of September for the autumn; though in plants that can be removed with the full balls of earth about the roots, it may be occasionally performed almost at any time; however, for any general shifting, the spring and autumn are the most successful seasons, as the plants then sooner strike fresh root; and many sorts preferably in the spring, by having the benefit of the same growing season, and that of summer.

In performing the business, it is mostly proper to remove the plants from the smaller to the larger pots, with the balls of earth about the roots, either wholly, or some of the outward old earth, the dry or matted radicle fibres only being carefully trimmed away, so as not to disturb the principal roots in the bodies of them, as by this means the plants receive but little check in their growth by the removal. Sometimes, when any particular plants, shrubs, or trees, &c. in their

pots, discover by their tops that they are in a declining state, as probably the defect may be either in the root, or the old balls of earth, it may be proper to shake all the earth entirely away, in order to examine the roots, and to trim and dress them as the case may require, re-planting them in entire fresh compost or mould.

In preparing for the business, where necessary to give larger pots, &c. it is proper to provide them of suitable sizes in some regular gradation larger than the old ones, according to the nature and growth of the plants, the whole being placed ready, with a proper quantity of fresh compost earth in proportion to the number and size of the plants intended to be shifted: then let these plants intended to be removed with balls, be taken out of their old pots separately, with the whole balls or clumps of earth about the roots as entire as possible; and when large or tolerably full, with a knife trim off some of the outward loosest earth, and the extreme fibres of the roots; but when small, and adhering together compactly, the whole may be preserved entire; and in either case, where there are very matted, dry, or decayed fibres surrounding the balls, they should be trimmed as it may seem necessary: in those of a fresh lively growth, the loose straggling parts only should be cut away: the requisite pruning, trimming, or dressing in the heads or tops should also be given where it may seem proper, according to the state of growth, and the natural habit of the different plants; but many sorts require little or none.

Having prepared the intended pots for the reception of the plants, by placing some pieces of tile or oyster-shell, &c. loosely over the holes at bottom, and laid in a little fresh earth two, three, or four inches deep or more, according to the size of the pot, the plant should be set in with its ball of earth, as above, filling up around it with more fresh mould, raising it an inch or two over the top of the ball; and giving directly a moderate watering to settle the earth close about the ball and roots regularly in every part, in a proper manner: in such cases where the ball in particular plants appears very compactly hard and binding, it may be proper to loosen it a little, by thrusting a sharp-pointed stick down into the earth in different parts, giving it a gentle wrench to open the earth moderately; or sometimes it may also be proper to trim away some of the old earth on the top and sides; then planting it as above, and filling up round and over the ball with fresh earth, and watering it afterwards.

In shifting hardy or tender, shrubby, succulent, or herbaceous plants, when any appear of a sickly, weak, or unhealthy growth, it may be advisable to clear off a considerable part of the

Vol. II.

outward old earth from the balls about the roots, or, in some cases, to shake it wholly away, that the defects in the growths, occasioned either by faults in the roots or in the earth, may be removed by pruning out any decayed or bad parts of the roots, and re-planting them wholly in fresh earth.

Sometimes particular sorts of plants in pots require shifting, more for the advantage of having fresh earth, than for want of new or larger pots; and as in this case some of the same pots may be still of an eligible size to re-pot them in, these pots should be well cleaned from all adhering parts of the old earth, and be replenished with entire new at the time of re-potting the plants; which being removed out of their pots, either with the entire balls about the roots, and part of the old mould cleared off all round, to admit of a larger portion of fresh earth in the pot at re-planting; or in some, appearing of an infirm or declining habit, the whole balls of old earth displaced clean to the roots; then having furnished the pots with fresh earth, the plants should be replaced in them, filling up the pot regularly with a sufficiency of the same fresh mould, and finishing with a moderate watering to settle the whole close about their roots.

After shifting, when the plants are not watered at the time, a moderate watering both to the earth in the pots to settle it close about the roots, and in most sorts highly over the tops or heads of the plants, should be given, in order to wash off any foulnesses; then the pots of plants should be set in their respective stations in the garden, &c.: the hardy kinds, if warm sunny weather, may be placed in a shady border for two or three weeks, till they have struck fresh root in the new earth: the tender sorts should be disposed in their places among the green-house and stove plants, or to have the benefit of shade in the middle of hot sunny days, till fresh struck, or probably some of the more tender particular sorts may require to be plunged in a hot-bed or bark-bed, especially some of the stove kinds: some principal sorts of the more curious or tender green-house plants, in order to expedite their fresh-rooting more effectually; and sometimes tender annuals in hot-beds, potted in their early young growth, may require to be replunged in the hot-bed to fresh strike, and forward them till June; but generally all the full ground or open air plants only require a little occasional shade in hot dry weather the first two or three weeks, and some shifted with full balls about the roots only need occasional watering: afterwards, on the whole, both the hardy and tender kinds should have repeated moderate waterings given them, according to their kinds.

SHOT INDIAN. See CANNA.

SIDA, a genus containing plants of the exotic, tender, herbaceous, perennial kind, for the hot-house.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved perianth, angular, half-five-cleft, permanent: the corolla has five petals, wider above, emarginate, fastened below to the tube of stamens: the stamina have very many filaments, united below into a tube, in the apex of the tube divided: anthers roundish: the pistillum is an orbicular germ: styles five or more; or else one many-cleft: stigmas headed: the pericarpium is a roundish-angular capsule, composed of five or more cells, (corresponding with the number of the styles or stigmas,) two-valved, awnless, acuminate or horned, opening above, or close, and finally separating: the seeds solitary, two, three, or five, roundish, mostly acuminate, convex on one side, angular on the other, fastened to the interior suture.

The species chiefly cultivated are: 1. *S. rhombifolia*, Rhomb-leaved Sida; 2. *S. periplocifolia*, Great Bindweed-leaved Sida; 3. *S. triquetra*, Triangular-stalked Sida; 4. *S. Abutilon*, Broad-leaved Sida; 5. *S. alba*, White-flowered Sida; 6. *S. cordifolia*, Heart-leaved Sida.

The first has the leaves lanceolate rhomb-shaped with the axils two-thorned. It is a native of the East Indies and Jamaica.

The second species has an annual root: the stem from two to four feet high, erect, simple, round, pubescent, sometimes divided towards the top into spreading branches: the leaves petioled, alternate, smooth, somewhat wrinkled, hoary beneath: the panicle terminating, half the length of the stem, erect, almost simple, spreading: the peduncles simply subdivided, alternate, filiform, the last one-flowered: the flowers pale, sometimes light purple. It is a native of the West Indies and Ceylon.

The third species is a shrub three feet in height, with subtomtose branches, having each of the three sides hollowed out with a blunt groove: the leaves cordate without angles, very soft, obscurely tomentose, bluntly serrate, acuminate: the peduncles axillary, one-flowered: the flower is of a yellow colour. It is a native of the West Indies.

The fourth species is in height about four feet, putting out some side branches towards the top: the leaves soft and woolly: the flowers axillary, on long peduncles. It is annual, and a native both of the East and West Indies, Virginia, and Siberia.

The fifth has the leaves round: the corolla is white with purple stigmas, and the tips of the petals purplish. It is annual.

The sixth has a hairy annual root: the stem simple, more than three feet high, sending out several erect branches from the sides: the leaves two inches and a half long, and two broad, of a light green colour, soft to the touch, on very long hairy footstalks: the calyx hairy: beaks of the seeds, when the corolla falls, prominent, in a bundle the length of the calyx: the capsules from seven to ten: the flowers small, of a pale obscure yellow- or sulphur-colour. It is a native of the East Indies and the Cape.

Culture.—These plants may be increased by seeds, which should be sown upon a moderate hot-bed in the early spring, or in pots deposited in them. In the first case, when the plants have attained some growth, they should be removed to another hot-bed and set out four inches apart each way, or into separate pots, replunging them in the hot-bed, being shaded till they have taken new root; a large proportion of free air being admitted in fine weather, and also frequent waterings: they should afterwards be gradually hardened to bear the open air in the summer season.

Some of them may also be raised from offsets and cuttings planted in pots in the summer season.

The fourth sort is sufficiently hardy to bear the open air: the seeds should be sown where the plants are to remain, as they do not bear transplanting well. It is an annual plant.

Some of the species do not flower till the second year; of course they should be placed in the stove in the autumn, and be managed during the winter as other tender exotic plants of the same nature.

They afford ornament among other potted plants in the stove, and the fourth sort in the borders.

SIDERITIS, a genus containing plants of the under shrubby, and shrubby exotic kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatae*.

The characters are: that the calyx is a one-leaved perianth, tubular, oblong, about half-five-cleft: segments acute, almost equal: the corolla one-petaled, almost equal: tube cylindrical, throat oblong, roundish: upper lip erect, bifid, narrow: lower lip trifid; lateral segments sharper, commonly smaller than the upper lip; middle segment roundish crenate: the stamina have four filaments, within the tube of the corolla, shorter than the throat, two of which are smaller: anthers roundish, two twin: the pis-

tillum is a four-cleft germ : style filiform, usually longer than the stamens : stigmas two : upper cylindrical, concave, truncate ; lower membranaceous, shorter, sheathing the upper : there is no pericarpium : calyx cherishing the seeds in its bosom : the seeds four.

The species cultivated are : 1. *S. Canariensis*, Canary Iron-wort ; 2. *S. Cretica*, Cretan Iron-wort ; 3. *S. Syriaca*, Sage-leaved Iron-wort.

The first has the stem five or six feet high, sending out several woody branches covered with a soft down : the leaves on long footstalks ; in young plants often five or six inches long, and two and a half broad near their base ; but in older plants not more than half that size ; they are very woolly, especially on their under side, which is white, but their upper surface is of a dark yellowish green : the flowers, which grow in thick whorled spikes at the end of the branches, are of a dirty white, and appear early in June : the plants frequently produce flowers again in autumn. It is a native of the Canaries and of Madeira.

The second species is a shrub with divaricating branches, very thickly tomentose and snow-white : the leaves cordate, crenate, tomentose on both sides, obtuse, very thickly tomentose and snow-white beneath, green above : the spike from the division of the branches, peduncled, pendulous, tomentose, snow-white together with the calyxes, which are blunt : the flowers about eight in each whorl. It is a native of the island of Crete or Candia.

The third has a short woody stem, with a few branches about a foot long : the leaves thick, wedge-shaped, very downy and white : the flowers in whorls towards the end of the branches, yellow with smooth downy calyxes. It has the appearance of a Sage, but is longer. The whole plant is covered with a very close white cotton. It is a native of the Levant, flowering from June to September.

There are other species that may be cultivated.

Culture.—These plants may be increased by seeds, cuttings and layers.

The seeds should be sown in pots in the spring, plunging them in a moderate hot-bed : when the plants have had some growth they should be removed into separate small pots filled with light mellow mould, being afterwards treated as other shrubby green-house plants.

The cuttings and layers may be planted out or laid down in the summer season, and when sufficiently rooted managed as the other sorts.

The third sort may be increased by planting the slipped heads either in pots or a shady border, to be afterwards removed into pots for protection in the winter in a frame.

They afford variety in green-house collections among other evergreen potted plants.

SIDEROXYLON, a genus containing plants of the shrubby, evergreen, exotic kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosa*.

The characters are : that the calyx is a five-cleft perianth, small, erect, permanent : the corolla one-petalled, wheel-shaped : segments five, roundish, concave, erect : toothlet cusped, serrate, at the base of each division of the petal, tending inwards : the stamens have five awl-shaped filaments, length of the corolla, alternate with the toothlets : anthers oblong, incumbent : the pistillum is a roundish germ : style awl-shaped, length of the stamens : stigma simple, obtuse : the pericarpium is a roundish berry, one-celled : the seeds five.

The species cultivated are : 1. *S. inerme*, Smooth Ironwood ; 2. *S. lycioides*, Willow-leaved Ironwood.

The first in its native situation rises to the height of an apple-tree ; but in this climate it is rarely more than eight or ten feet high : the wood is so heavy as to sink in water, and being very close and hard, the name of Iron-wood has been given it : it divides into many branches, which are covered with a russet bark : the leaves about three inches long, and an inch and half broad in the middle, ending in points at both extremities, placed without order on the branches, having footstalks an inch long : they are smooth, of a lucid green, and continue all the year : the flowers come out in clusters from the side of the branches upon short footstalks, which branch out into several smaller, each sustaining a single flower, which is small and white. It flowers in July, and is a native of the Cape.

The second species is a tree with axillary solitary spines and alternate leaves : the peduncles axillary, one-flowered, very many, a little longer than the petioles : the calyx five-cleft, obtuse : the corolla funnel-form, five-cleft, obtuse ; with the segments concave, scarcely unfolded : nectary five-leaved, serrate, short, each lobe to each segment of the corolla : the stamens ten, awl-shaped, length of the nectary ; anthers sagittate : germ globular : style filiform ; stigma very small : the berry black, globular, from three- to five-celled, commonly abortive. It is a native of South America.

Culture.—These plants may be increased by seed procured from abroad, which should be sown in the spring in pots filled with fresh mould, and plunged in the tan-bed of the stove : when the plants have some growth, they should be removed into separate pots and be rephunged in the bark-bed.

They are sometimes raised from slit-layers and cuttings in the summer season; but they are tedious in forming roots in this way, and the plants are not so good.

The first is tender, affording variety in the stove; but the last is more hardy, and may sometimes be introduced in the shrubby borders in warm sheltered situations.

SILENE, a genus containing plants of the hardy herbaceous, of the annual and perennial kind.

It belongs to the class and order *Decandria Trigynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a one-leaved perianth, ventricose, five-toothed, permanent: the corolla has five petals: claws narrow, length of the calyx, margined: border flat, obtuse, often bifid: nectary composed of two toothlets in the neck of each petal, forming a crown at the throat: the stamens have ten awl-shaped filaments, alternately inserted into the claws of the petals, and later than the other five: anthers oblong: the pistillum is a cylindrical germ: styles three, simple, longer than the stamens: stigmas bent contrary to the sun's apparent motion: the pericarpium is a cylindrical capsule, covered, one- or three-celled, opening at top into five or six parts: the seeds very many, kidney-form.

The species cultivated are: 1. *S. armeria*, Common or Lobel's Catchfly; 2. *S. quinquevulnera*, Variegated Catchfly; 3. *S. pendula*, Pendulous Catchfly; 4. *S. muscipula*, Spanish Catchfly; 5. *S. viridiflora*, Green-flowered Catchfly; 6. *S. nutans*, Nottingham Catchfly; 7. *S. fruticosa*, Shrubby Catchfly.

The first is an annual plant with erect stalks, a foot and half high, for more than an inch below each joint very glutinous: the lower leaves broad, oblong, smooth, sessile: the flowers in terminating bunches, standing erect, and forming a kind of umbel. It is a native of Denmark, &c. flowering in July and August.

There are varieties with a bright purple flower, with a pale red, and with a white flower.

In the second, from a small fibrous annual root arise several flaccid spreading stems, round, hairy, and a little viscid; as are also the leaves in a slight degree: numerous flowers spring in an alternate order from the bosoms of the upper leaves, on pedicels which are erect, or but little divaricated even when the fruit is ripe: the petals are remarkable for the deep red spot in their centre, like a drop of blood. It is a native of the South of Europe.

The third is an annual plant, from whose root come out several branching stalks, near a

foot and half long, which trail upon the ground, opposite: the leaves oval, acute-pointed: the flowers come out singly from the axils, upon short peduncles; they are large, and of a bright red colour, resembling those of the common Wild Red Campion. It is a native of Sicily and Crete or Candia, flowering in May and June.

The fourth species has a biennial root: the stalk round, clammy, a foot and half high, having swelling joints: the leaves narrow and smooth, growing round the stalk in clusters: the upper part of the stalk divides into spreading branches by pairs, and has red flowers coming out singly from the axils, and sessile: the plant is extremely viscid. It is a native of the South of France, &c.

The fifth has a biennial root: the lower leaves roundish and hollowed like a spoon: those upon the stalks obtuse, and standing by pairs, threes or fours round the stalks; they are deep green, smooth and sessile: the stalks round, smooth, from two to three feet high: the flowers in loose spikes at the top, of a green colour. It is a native of Spain, &c. flowering in June and July.

The sixth species has a somewhat woody perennial root: the stems several, simple, (according to Mr. Woodward frequently branched from the root,) a foot or more in height, erect, leafy, round, pubescent, jointed at the base, viscid in the upper part, terminating in a forked panicle, the summit and branches of which all droop towards one side: the leaves lanceolate acute, quite entire, pubescent on both sides, of a palish green; the radical ones inclining to obovate, and forming thick tufts: the flowers drooping, white, of a delicate texture. It is a native of several parts of Europe, flowering in June and July.

The seventh has the stem low, shrubby, dividing into several short branches: the leaves smooth, ending in acute points: the flower-stalks rise about a foot high, and divide into spreading panicles, sustaining two and three flowers, of an herbaceous white colour. It is a native of Sicily, flowering in June and July.

Culture.—The annual and biennial sorts may be raised by seeds, which should be sown in the spring or autumn seasons, where the plants are to grow; but the latter is the better time. Some sow at both seasons, which may be a good practice. The seed should be put in in patches in the borders, clumps, &c.: when the plants are up they should be thinned to two or three plants in each clump and be kept clean from weeds. With the biennial sorts it is sometimes the practice to sow them in beds, and when the plants are up to remove them into nursery-rows

till the autumn, when they are planted out in the borders, &c.

The perennial sorts may likewise be increased from seeds in the same manner; but the usual way is by slips of the heads, and parting the roots, planting them out in shady places in the spring or early summer months. The shrubby sort may be increased by slips and cuttings of the branches or shoots, which should be planted out in similar situations in the spring and summer seasons.

They all afford ornament and variety in the clumps and borders of pleasure-grounds.

SILPHIUM, a genus containing plants of the tall-growing, herbaceous, perennial kind.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Oppositifoliæ*.

The characters are: that the calyx is common ovate, imbricate, squarrose: scales ovate-oblong, bent back in the middle, prominent every way, permanent: the corolla compound radiate: corolllets hermaphrodite in the disk many: females in the ray fewer: the proper of the hermaphrodites one-petalled, funnel-form, five-toothed; the tube scarcely narrower than the border:—of the females lanceolate, very long, often three-toothed: stamens in the hermaphrodites: filaments five, capillary, very short: anther cylindrical, tubular: the pistillum in the hermaphrodites: germ round, very slender: style filiform, very long, villose: stigma simple:—in the females, germ obcordate: style simple, short: stigmas two, bristle-shaped, length of the style: there is no pericarpium: calyx unchanged: the seeds in the hermaphrodites none:—in the females solitary, submembranaceous, obcordate, with the edge membranaceous, two-horned, emarginate: the receptacle chaffy: chaffs linear.

The species cultivated are: 1. *S. laciniatum*, Jagged-leaved Silphium; 2. *S. terebinthinum*, Broad-leaved Silphium; 3. *S. Asteriscus*, Hairy-stalked Silphium; 4. *S. trifoliatum*, Three-leaved Silphium.

The first has a perennial root: the stem twice the height of a man, as thick as the thumb, quite simple, smooth below, above rugged with brown tubercles and white spreading hairs, round: the leaves petioled, two feet in length and a foot in breadth, embracing at the base, pinnatifid; segments on each side four or five, distant, narrow, tooth-sinuate, rugged, with very solid ribs raised on both sides; margin of the upper leaves purplish: the calyx of ten scales, ending in large awl-shaped spines: the petals of the ray thirty, length of the calyx, with a bifid slender style: the florets of the disk yellow, many, separated by chaffs, attenuated at

the base, with a simple style. It is a native of North America, flowering from July to September.

The second species has two or three stems, strong, upright, annual, smooth; paniced above, but without any branches throughout the whole length, being beset with distant leaves: radical and lower cauline leaves large, heart-shaped, upright, rough, sharply toothed on the edges, and ciliated with very short hairs; they are very veiny, but not wrinkled: the footstalks are long, and embrace the stem at their base: the stem-leaves are similar, but scarcely hearted at the base, and the others are more oblong, and half embrace the stem: the peduncles are elongated, round, and mostly leafless; though a few of them are furnished with two opposite leaflets: the terminal flower on the stem flowers first, and when this begins to seed the lateral peduncles of the panicle begin to extend and proceed to flower: the smell of the flower, which is moderately large, and yellow, is similar to that of the Sun-flower. It is a native of North America, flowering in August and September.

The third has a perennial root: the stem four or five feet high, thick, solid, set with prickly hairs, and having many purple spots: the lower leaves alternate; upper opposite and sessile, rough, about two inches long, and an inch broad near the base, having a few slight indentures on their edges: the upper part of the stem divides into five or six small branches, terminated by yellow radiated flowers like those of the perennial Sun-flower, but smaller, having generally nine florets in the ray. It is a native of North America, flowering from July to September.

The fourth species has a perennial and woody root: the stems annual, rising five feet high or more in good land, of a purplish colour, and branching towards the top: the leaves oblong, rough, having some sharp teeth on the edges; they are from three to four inches long, and almost two broad; towards the bottom of the stem they stand by fours at each joint; higher up they are by threes, and at the top by pairs, sitting close to the stems: the flowers upon pretty long peduncles, solitary. It is a native of many parts of North America, flowering from July to October.

Culture.—They are all readily increased by parting the roots and planting them out in the autumn or spring, where they are to remain in the borders and clumps. They may also be raised by planting the slips in the same manner: they should be afterwards managed as the perennial Sun-flower.

They afford a good variety and effect among other perennial plants in the summer season.

SILVER BUSH. See ANTHYLLIS.

SILVER TREE. See PROTEA.

SIMPLER'S JOY. See VERBENA.

SINAPIS, a genus containing a plant of the hardy herbaceous annual kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siligosæ* or *Cruciformes*.

The characters are: that the calyx is a four-leaved perianth, spreading: leaflets linear, concave-channelled, cruciform-spreading, deciduous: the corolla four-petalled, cruciform: petals roundish, flat, spreading, entire: claws erect, linear, scarcely the length of the calyx: nectarcous glands four, ovate: one on each side between the shorter stamen and the pistil, and one on each side between the longer stamens and the calyx: the stamens have six awl-shaped filaments, erect: two of them opposite, the length of the calyx, and four longer: anthers from erect spreading, acuminate: the pistillum is a cylindrical germ: style length of the germ, height of the stamens: stigma capitate, entire: the pericarpium is an oblong silique, torose below, rugged, two-celled, two-valved: partition for the most part twice the length of the valves, large, compressed: the seeds many, globular.

The species cultivated are: 1. *S. alba*, White Mustard; 2. *S. nigra*, Common or Black Mustard.

The first has an annual root: the stem strong, hard, nearly round, upright, branched, striated or finely grooved, set with numerous stiffish hairs pointing downwards, from a foot and half to two feet in height: the leaves petioled, alternate, pale green, rough with strong hairs on both sides, all deeply indented or lobed, the terminating segment very broad and large, and frequently a pair of small wings on the petiole: the lower ones deeply pinnatifid; the upper ones sublyrate: the flowers on loose racemes or bunches at the ends of the branches, on horizontal pedicels, which have four grooves or corners, and strong hairs pointing downwards. It is a native of Germany, &c.

It is generally cultivated in gardens as a sallad herb, with Cresses, Radishes, &c. for winter and spring use.

The second species has an annual small root: the stem upright, round, streaked, the upper part smooth, three or four feet in height, with many distant spreading branches: the leaves petioled, variously lobed and toothed; those next the root lyrate, rugged; on the stem smooth, the upper ones frequently simple, lanceolate and sharply toothed; the very uppermost quite entire. It is a native of Europe.

It is the flour of the seed of this plant that affords the common mustard for the table.

Culture.—The first sort is sown along with other small sallad herbs at all times of the year, sometimes every week or fortnight, in a bed or border of light earth, sown generally in shallow drills very thick, covering it very thinly with earth; and in winter, and early in spring, during cold weather, in hot-beds. The herbs are always cut for use whilst in the seed-leaf and but a few days old; otherwise they become too strong and rank-tasted for use. See SALLAD HERBS and SMALL SALLADING.

In order to have seed of this sort for garden use, it should be sown on an open spot of ground in March or April, either thinly in drills a foot asunder, or broad-cast all over the surface, and the plants be left to run up to stalk, when they will furnish ripe seeds in August.

But in order to raise the plants for the seed for mustard, the seeds should be sown in the spring, any time in March, in some open situation, either in the kitchen-garden or in open fields: in either case, having dug or ploughed the ground, the seed should be sown broad-cast all over the surface, and raked or harrowed in lightly; or it may be sown in shallow drills a foot asunder, and be slightly covered in: the plants soon come up, and when they have four or more leaves an inch or two broad, if they stand very thick, those sown in the broad-cast way particularly should be hoed and thinned, leaving them six or eight inches asunder, cutting up all weeds, repeating the operation once or more if necessary; after this the plants will soon spread and cover the ground, and shoot fast up to stalks for flowers and seed, which ripen in July or August, when the stalks should be cut or pulled up, and the seed, being properly hardened, and dried in the pod, should either be thrashed out directly, or stacked up dry and thrashed at occasional opportunities afterwards; but the first is the best method.

SISYMBRIUM, a genus containing a plant of the hardy herbaceous kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siligosæ*, *Cruciformes* or *Cruciferae*.

The characters are: that the calyx is a four-leaved perianth: leaflets lanceolate-linear, spreading, coloured, deciduous: the corolla four-petalled, cruciform: petals oblong, spreading, commonly less than the calyx, with very small claws: the stamens have six filaments, longer than the calyx; of these two opposite a little shorter: anthers simple: the pistillum is an oblong filiform germ: style scarce; any: stigma obtuse: the pericarpium is a silique, long, incurved, gibbous, round, two-

celled, two-valved: valves in opening straightish, partition a little longer than the valves: the seeds very many, small.

The species is *S. Nasturtium*, Common Water Cress.

It has perennial roots, consisting of long white fibres, the lowermost fixed in the soil, the rest suspended in the water: the stems spreading, declining or floating, angular, branched, leafy: the leaves alternate, pinnate, somewhat lyrate, the terminating and upper leaflets being the largest: all the leaflets roundish, more or less heart-shaped, smooth, shining, waved or toothed, frequently tinged with a purplish brown hue: the flowers white, in a corymb, soon lengthened out into a spike: the pods shortish, on horizontal pedicels, but the pods themselves recurved upwards: the stigmas nearly sessile: but according to Curtis, the root is annual. Withering marks it as biennial. It is a native of Europe, Asia, &c.

Culture.—This may be effected by parting the roots, or by seed. In the first method, while the plants are young, a quantity of slips should be made with root-fibres to them, and be planted out immediately in a shallow, trickling, watery situation, when they will readily strike roots, seed, and increase themselves.

The seed should be collected during the summer season, and sown in the same places; or, which is better, the plants, with the ripened seeds upon them, be thrown into them, where they will strike root, and shed their seeds for future increase.

These plants are in much esteem as winter and spring salad herbs.

SISYRINCHIUM, a genus containing plants of the flowery perennial kind.

It belongs to the class and order *Monadelphia Triandria*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx is a common ancipital spathe, two-leaved: valves compressed, acuminate: proper several, lanceolate, concave, obtuse, one-flowered: the corolla one-petalled, superior, six-parted: segments obovate with a point, from erect spreading: three outer alternate, a little wider: the stamina have three filaments, united into a subtriquetrous tube shorter than the corolla, distinct at the top: anthers bifid below, fastened by the back: the pistillum is an obovate inferior germ: style three-sided, length of the tube: stigmas three, thickish, awl-shaped at the top, erect: the pericarpium is an obovate capsule, rounded, three-sided, three-celled, three-valved; with the partitions contrary: the seeds several, globular.

The species are: 1. *S. Bermudiana*, Iris-leaved Sisyrinchium; 2. *S. anceps*, Narrow-leaved Sisyrinchium.

The first has a fibrous root, from which arise some stiff sword-shaped leaves, four or five inches long and half an inch broad, of a dark green colour: from among these comes out the stalk (scape) six inches high; it is compressed, and has two borders or wings running the whole length, and three or four spear-shaped leaves embracing it; these grow erect, and are hollowed like the keel of a boat: the stalk is terminated by a cluster of six or seven flowers, on short peduncles, and enclosed in a two-leaved, keel-shaped sheath, before they open; they are of a deep blue colour with yellow bottoms, which, when fully expanded, are an inch over. It is a native of Bermuda.

The second species has a perennial fibrous root, from which arise many very narrow spear-shaped leaves, about three inches long, and scarcely an eighth of an inch broad, of a light-green colour: the stalks about three inches high, very slender, compressed and bordered, having short, narrow, sword-shaped, embracing leaves: they are terminated by two small pale-blue flowers, inclosed in a two-leaved sheath, upon longer peduncles than those of the first sort, flowering about the same time. It is a native of Virginia.

It is observed, that the leaves, stalks, and flowers of the first sort are three times as large as in the second, and the sheath incloses six or seven flowers; whereas the second has rarely more than two, and these expand only for a short time in the morning, while in the former they continue open the whole day.

Culture.—These plants may be increased by seeds and parting the roots: in the former method the seeds of the first sort should be sown in the autumn as soon as they become ripe, on a border which has an eastern aspect, in drills at three or four inches distance, covering them about half an inch with fine mould: they should afterwards be kept clean from weeds with care. They succeed best in a loamy soil in a shady situation, and where the ground has not been manured.

In the latter sort the seeds should be sown in pots, in order that they may be protected in the green-house.

The first affords ornament in the large open borders and clumps, and the latter among other green-house plants.

SIUM, a genus containing a plant of the hardy, herbaceous, esculent kind.

It belongs to the class and order *Pentandria*

Digynia, and ranks in the natural order of *Umbellales* or *Umbelliferae*.

The characters are: that the calyx is an universal umbel, various in different species: partial spreading, flat: involucre universal many-leaved, reflex, shorter than the umbel, with lanceolate leaflets: partial many-leaved, linear, small: perianth proper scarcely observable: the corolla universal uniform: floscules all fertile: proper of five index-cordate, equal petals: the stamina have five simple filaments: anthers simple: the pistillum is a very small germ, inferior: styles two, reflex: stigmas obtuse: there is no pericarpium: fruit subovate, striated, small, bipartite: the seeds two, subovate, convex and striated on one side, flat on the other.

The species cultivated is *S. sisarum*, Skirret.

It has the root composed of several fleshy tubers as large as a man's little finger, and joining together in one head: the lower leaves are pinnate, having two or three pairs of oblong leaflets terminated by an odd one: the stalk rises a foot high, and is terminated by an umbel of white flowers, which appear in July, and are succeeded by striated seeds like those of Parsley, ripening in autumn. It is a native of China, &c.

It was formerly much cultivated for the roots, which were eaten boiled, and stewed with butter, pepper, and salt; or rolled in flower and fried; or else cold with oil and vinegar, being first boiled.

Culture.—It may be raised either by seeds or slips from the roots, but the first is the best method, as in the latter mode the roots are apt to become sticky: the seeds should be sown about the beginning of April, either in broadcast over the surface, or in drills, the ground being previously well dug to a good depth; light and rather moist land being chosen for the purpose. The plants mostly appear in five or six weeks, and when they can be sufficiently distinguished by their leaves, the ground should be well hoed over, in the same manner as for carrots, the plants being properly thinned out to the distance of five or six inches. The hoeing should be repeated as often as necessary, in dry weather.

In the autumn when the leaves begin to decay the roots will be fit for use, and will continue so till the spring.

In the offset method, the old plants should be dug up in the spring before they begin to shoot, the side shoots being then slipped off with an eye or bud to each, planting them in rows a foot apart, and four or five inches distant in the rows; they should afterwards be cultivated as the others.

These roots are prepared by boiling, and eaten

in the same manner as above, or as carrots and parsnips. They are wholesome, but not in such request as formerly.

SLIPS, such portions of plants as are slipped off from the stems or branches for the purpose of being planted out.

A number of plants, both of the woody and herbaceous kinds, are propagated by slips, which is effected in the woody kinds by slipping off small young shoots from the sides of the branches, &c. with the thumb and finger, instead of cutting them off with a knife, but there is no material difference, in the success or future growth, between slips and cuttings, only the former in small young shoots is more proper to be shipped off by the hand, which in numerous small, shrubby plants will grow; but is more commonly practised on the lower ligneous plants, such as sage, winter-savory, hyssop, thyme, southernwood, rosemary, rue, lavender, and others of low shrubby growths. The best season of the year for effecting the work is generally in spring and beginning of summer, though many sorts will grow if planted at almost any time, from the spring to the latter end of the summer, as shown in speaking of their culture.

In performing the work of slipping in these sorts, the young shoots of but one year's growth, and in many sorts the shoots of the year should be chosen as growing the most readily, even when to plant the same summer they are produced, especially the hard-wooded kinds: but in the more soft-wooded plants, the slips of one year's growth will also often readily grow; being careful always to choose the moderately growing side-shoots situated on the outward part of the plants, from three to six or eight inches long, slipping them off close to the branches, and clearing off the lower leaves; then planting them either in a shady border, if in summer, and watered, or so as they can be occasionally shaded in hot sunny weather, especially small slips, inserting the whole two parts of three in the ground, giving occasional water, in dry warm weather, till properly rooted; and then towards autumn, or in spring following, transplanting them where they are to remain.

But in planting slips of the shoots of tender shrubby exotics of the green-house and stove, many sorts require the aid of a hot-bed or bark-bed, to promote their emitting roots more effectually, as shown in their respective culture; but some others of the shrubby kinds, such as geraniums, will root freely in the natural earth in summer; and many of the herbaceous tribe, producing bottom-rooted offsets for slips, as aloes, &c. also readily grow, either with or

the con-
 dunge the
 s them off
 use plants
 into large
 ll under-
 op, sage,
 as roses,
 her sorts,
 o separate
 d planted
 here they

us plants,
 &c. into
 into many
 increased
 some sorts
 ead of the
 their bot-
 branches
 eater part
 bulbous-
 ted kinds

performed
 the roots
 the small
 generally
 a year or

slipping
 spring or
 e effected
 th roots,
 more ef-
 of plants
 ate parts,
 , planting
 year, to
 g may be
 ain. See

h young
 ough the
 ds. For
 f a warm
 ger prin-
 ive, and
 vour and

mustard,
 mes cab-
 ing use;
 ion when
 week or

ten or twelve days old, whilst they remain
 mostly in the seed-leaf, being then cut up close
 to the ground for use; for, being mostly of a
 warm relish, in which consists their chief ex-
 cellence for winter and spring salads, if suffered
 to grow large, and run into the rough leaf,
 they become of a disagreeable, strong, hot
 taste; but when used as above, they eat ex-
 ceedingly tender, with an agreeable warm fla-
 vour.

For the purpose of salading, these plants
 may be obtained young at all times of the year,
 in spring and summer in the open ground, and
 in winter under the shelter of frames and glasses,
 and occasionally on hot-beds.

This sort of salading is procured by sowing
 the seeds of the different plants at different times
 throughout the whole year.

Winter and Spring Culture.—In the winter
 and spring it may be raised either in hot-beds or
 in the open borders, and, according as it may be
 required, early or late; but when it is required
 as early as possible, it must be sown in hot-beds
 under frames and lights, &c. or in a bed or bor-
 der of natural earth under glasses.

The sowing should be made on hot-beds any
 time in December, January, or February; and
 where a considerable supply is daily required, may
 be continued sowing every week or fortnight in
 hot-beds till March, or during the cold weather,
 for which a moderate hot-bed of dung should
 be made for one, two, or more garden-frames,
 but only half a yard or two feet depth of dung,
 according to the temperature of the season, as the
 heat is only required to bring up the plants
 quickly, and forward them a week or two in
 growth, placing a frame directly thereon, and
 moulding the bed all over with light rich earth,
 five or six inches thick, making the surface level
 and smooth; when, if it is to be forwarded as
 much as possible, directly sow the seed, which
 may be done either in drills as shallow as pos-
 sible, about two or three inches broad, and flat
 at the bottom, and three inches asunder, sowing
 the seeds of each sort separate and very thick,
 so as almost to cover the ground, only just co-
 vering them with earth; or, to make the most
 of the bed, it may be sown all over the surface,
 previously smoothing it lightly with the back of
 the spade, the different sorts separately, and all
 very thick; and after pressing them all even and
 lightly down with the spade, covering them very
 thinly with earth, by sifting over as much light
 mould as will only just cover the seed; and as
 soon as the sowing is performed in either me-
 thod, putting on the lights: the seeds soon
 come up, as in two or three days or less, being
 careful at this time to give vent to the steam

arising in the bed, as well as to indulge the plants with plenty of free air daily, either by tilting the lights in the back or front, according to the temperature of the weather, or by drawing the lights a little down, or taking them quite off occasionally in mild days at first; for the hot-bed being yet new, there will be a considerable steam arising; and the salading coming up very thick, unless due vent be given to pass off the steam and admit fresh air, they will be apt either to burn or fog (as the gardeners term it), and mould off as fast as they come up. Such hot-beds, however, as are not fresh made, do not require this precaution; but in new-made beds it must be strictly observed till the salading is all fairly come up, and as long as the strong steam continues: the plants will mostly be fit for use in a week or ten or twelve days from the time of sowing the seed.

In order to have a proper succession, the sowing in the hot-beds should be repeated every week or fortnight during the cold weather; the same hot-bed sometimes retaining its heat will admit of two sowings, by sowing again as soon as the first crop is gathered: however, to obtain a regular supply daily, it is necessary to continue making fresh hot-beds occasionally.

Where only a small quantity may be wanted at a time, and there is the convenience either of cucumber and melon hot-beds, or a hot-house, &c., some seed of each sort may be sown in pots or boxes, and placed in these hot-beds or the stove, just to bring up the plants fit for use.

Where there are not frames and glasses, hand- or bell-glasses may be used, or the bed be arched over with low hoop-arches, in order to cover with mats every night, and in bad weather.

And where there are no hot-beds, in cold weather, early in the spring, part of a warm border, or a bed of light earth in a sunny situation may be prepared, for garden-frames and lights, hand-glasses, &c. raising the ground somewhat to the sun; and having dug it, and raked it fine, sow the seed as above, covering it lightly with earth; and having set on the frames and glasses, the seeds will soon come up, and the salading be ready a considerable time sooner than in the open ground.

Culture in the full Ground.—From about the end of February, or beginning of March, according to the forwardness or mildness of the season, Small Salading may be sown in the open ground, repeating the sowings every week or ten days; the first sowing being performed on a warm border; continuing the sowings in that situation till the beginning or middle of April, when it may be sown in any of the open quarters, and in which the sowings may be repeated

weekly, or once a fortnight, as required; but according as the hot weather approaches, sowing in a somewhat shady situation.

The ground for each sowing in the different situations should be properly dug, and the surface raked smooth and even.

These sowings are mostly made in shallow drills, which should be drawn with a small hoe either with the corner, or held edge-ways downward, horizontally, drawing the drills along evenly, as shallow as possible, and flat or level at bottom, at three or four inches asunder, in which the seed should be put evenly all along the bottom, each sort separate, and very thick, covering them in evenly with the finest of the mould, not more than a quarter of an inch deep; or if the smaller seeds are but just covered, it is sufficient; for when sown very thick, if deeply covered with mould, the plants do not rise regularly.

In these early spring sowings, on cold nights and all bad weather it is proper to cover the ground, both before and after the plants begin to rise, with large mats, which will be better if supported on low hoop-arches, or ranges of pegs stuck in the ground just high enough to support the mats a little from the earth, by which a more effectual as well as forward crop is produced.

In the later sowings, when dry warm weather commences, it is proper to give occasional waterings.

It is likewise sometimes necessary, where the surface of the ground becomes crusted, from wet, &c. as the plants rise thick, to slightly brush over the surface with the hand or a soft broom, so as to reduce the surface mould a little, and promote their coming up.

Summer Sowings.—When the sowings are practised in summer, they should be made more frequently, and the ground be kept watered occasionally, both before and after the plants are come up.

Autumn Sowings.—The sowings may be continued in the open ground all September and October, also occasionally in November in mild seasons; and until towards the middle of October they may be made in any open situation; but from the middle or latter end of October and in November they must be on warm south borders, performing the sowings as above; and in cold nights bestowing a covering of mats, or hand-glasses, &c. repeating the sowings every week or ten days, or a fortnight, as required.

In gathering young salading, it should be cut carefully close to the ground while quite young, in performing which, a large pair of scissors is very convenient.

In order to have good seed, some plants should be preserved annually for the purpose.

nts of the
cia Hex-
r of Sar-

the calyx
l-shaped:
base, bent
o corolla,
e stamina
oblong:
us: there
e germ:
ong, bent
a globular
bular.

. *aspera*,
Smilax;
or Sarsa-
Smilax;
Smilax;
S. *China*,
Bastard

composed of
wide, and
ler, angu-
nes, and
which they
g plant for
the leaves
ed, three-
and about
rked with
es set with
ers axillary
e those on
ed berries
s black. It
y, &c.

aves eared
e those of
nered and
s by their
g, and an
se, having
es on their
ose of the

ed into se-
nt thicker
ly brown,
in length:
scandent:
g tendrils
y three or
le. It is a
d August.

The fourth species has a thick stalk, taper, rising by claspers ten or twelve feet high: the leaves thick, three inches and a half long, and an inch and half broad: the flowers axillary in round bunches, and succeeded by black berries. It is a native of Virginia and Carolina, flowering in July.

The fifth has the stems taper: the leaves four inches long, and two inches and a half broad at their base, having seven longitudinal veins: the flowers come out in long loose bunches from the side of the stalks, and the berries are black. It is a native of North America, flowering in June and July.

In the sixth the leaves have the form of the hederaceous plants, but not the consistence, for they are thin: the little umbels of small flowers are on very long slender peduncles, from the bottom of the leaves. It is a native of North America, flowering in July.

The seventh has a taper stem, very strong, armed with short stiff spines, and rising twenty feet high by their claspers: the leaves thick, four inches long, and three inches and a half broad at their base, ending in an obtuse point, and having five longitudinal veins: the flowers in close bunches: the berries red: the root horizontal, creeping far and wide, with oblong tubers, knobbed and warted, sometimes branched, pale or reddish within, half a foot long, roundish, scattered. It should be chosen full, heavy, and compact, of a reddish colour, and free from rottenness; for it is much subject to be gnawed by worms. It is a native of China, Cochinchina, and Japan.

The eighth species has a shrubby stem, very long, slender, with few scandent branches: the leaves small, the lower cordate, the upper ovate-lanceolate, three-nerved, quite entire, flat, with the margin bent back: the flowers in lateral umbels: the berries red: the root is horizontal, simple, thick, short, tubercled, with many long undivided fibres: but according to Browne, small, and divided into a number of slender branches. It is a native of Virginia, Jamaica, China, &c.

Culture.—The six first hardy sorts may be increased by slipping the roots, layers, and seed.

In the first mode the stalks arising from the roots should be slipped with roots to each in the autumn, and be planted out either in nursery-rows for a year or two, or, which is better, where they are to grow.

In the layer method, the stalks should be laid down in the common manner in autumn, and when well rooted, in the autumn following be taken off and planted out as above.

The seed should be obtained from abroad, and

be sown in pots filled with fine mould in the spring, being plunged in a hot-bed to forward their coming up: when the plants have attained some growth they should be planted out and managed as the others.

The two last tender sorts may be increased by layers of the young shoots, and dividing the roots, which should be laid down, or planted out in the spring season in pots, in order to have the culture of other woody green-house plants of the same nature.

The layers will be ready to take off in the spring following.

The first sorts are proper for shady situations, borders, &c. and the latter afford variety in the green-house collections.

SMYRNium, a genus containing a plant of the herbaceous esculent kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ* or *Umbelliferae*.

The characters are: that the calyx is an universal umbel, unequal, becoming daily bigger: partial erect: the involucre universal none: partial none: perianth proper scarcely apparent: the corolla is universal uniform: floscules of the disk abortive: proper of five lanceolate petals, slightly bent-in, keeled: the stamina have five simple filaments, length of the corolla: anthers simple: the pistillum is an inferior germ: styles two, simple: stigmas two, simple: there is no pericarpium: fruit oblong, striated, bipartite: the seeds two, lunulate, on one side convex, marked with three angles, flat on the other.

The species cultivated is *S. Olusatrum*, Common Alexanders.

It has a biennial root, fleshy, branched: the whole herb of a pale bright green, often of a sickly yellowish cast, smooth, succulent, in flavour something like Celery, but more strong and bitter: the stem round, strong, deeply grooved: the upper leaves ternate, lower triterminate; leaflets wide, varying in form, gashed and serrate, subpetioled: the common petiole dilated at the base, ventricose, and nerved: umbels terminating, globular, many-rayed: the flowers small, numerous, irregular, greenish yellow: the fruit large, black, remarkably gibbous, deeply grooved. It is a native of France, Spain, Italy, &c.

Culture.—These plants are raised from seeds, which should be sown in the spring in any light soil and open situation, in shallow drills, fifteen or eighteen inches asunder; and when the plants are come up two or three inches high, be thinned out to six or eight inches distance in the rows, to give them room to shoot up strong; when earth must be drawn up about them gradually, in order to blanch or whiten them a little below, that they may be more crisp and

tender for autumn and winter use; but as in the spring following they shoot out again vigorously, some earth should be hoed up close about each plant, and in three or four weeks they will be blanched fit for use.

It is used as a culinary plant, when blanched, in the same manner as celery, and is of a warm aromatic quality.

SOIL, the mould or earth in which plants grow. For the general purposes of gardening, those of the dry, light, friable, loamy kinds are the most valuable, especially when they have been well impregnated and enriched with manure. See **EARTH, COMPOST, AND MANURE.**

SNAIL-FLOWER. See **PHASEOLUS.**

SNAIL-TREFOIL. See **MEDICAGO.**

SNAKE-GOURD. See **TRICOSANTHUS.**

SNAP-DRAGON. See **ANTIRRHINUM.**

SNAP-TREE. See **JUSTICIA.**

SNOWBALL-TREE. See **VIBURNUM.**

SNOWBERRY. See **CHIOCOCCA.**

SNOWDROP. See **GALANTHUS.**

SNOWDROP-TREE. See **CHIONANTHUS.**

SOAP-BERRY. See **SAPINDUS.**

SOAPWORT. See **SAPONARIA.**

SOLANUM, a genus containing plants of the herbaceous, shrubby, and tuberous-rooted, esculent kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridæ*.

The characters are: that the calyx is a one-leaved perianth, half-five-cleft, erect, acute, permanent: the corolla is one-petalled, wheel-shaped: tube very short: border large, half-five-cleft, from reflex flat, plaited: the stamina have five awl-shaped filaments, very small: anthers oblong, converging, subcoalescent, opening at the top by two pores: the pistillum is a roundish germ: style filiform, longer than the stamens: stigma blunt: the pericarpium is a roundish berry, smooth, dotted at the top, two-celled; with a convex fleshy receptacle on each side: the seeds very many, roundish, nestling.

The species cultivated are: 1. *S. Lycopersicum*, Love-Apple, or Tomato; 2. *S. Æthiopicum*, Ethiopian Nightshade; 3. *S. Melongena*, Large-fruited Nightshade, or Egg Plant; 4. *S. Dulcamara*, Woody Nightshade, or Bitter-sweet; 5. *S. verbascifolium*, Mullein-leaved Nightshade; 6. *S. Pseudo-Capsicum*, Shrubby Nightshade, or Winter Cherry; 7. *S. quercifolium*, Oak-leaved Nightshade; 8. *S. mammosum*, Dug-fruited Nightshade; 9. *S. Indicum*, Indian Nightshade; 10. *S. Carolinense*, Carolina Nightshade; 11. *S. sodomium*, Black-spined Nightshade; 12. *S. sanctum*, Palestine Nightshade; 13. *S. tuberosum*, Tuberous-rooted Nightshade, or Common Potatoes.

The first is an annual plant, with an herbaceous, branching, hairy stalk, rising to the height of six or eight feet if supported, otherwise the branches will fall to the ground: the leaves pinnate, of a very rank disagreeable odour, composed of four or five pairs of leaflets terminated by an odd one, cut on their edges, and ending in acute points: the flowers axillary on pretty long peduncles, each sustaining several yellow flowers, forming a single long bunch. The fruit is smooth, but varies in form, size and colour, from which Miller has formed two sorts.

The first of these is commonly cultivated in the South of Europe to put into soups and sauces, to which it imparts an agreeable acid flavour: the fruit is very large, compressed both at top and bottom, and deeply furrowed all over the sides, and of a red or yellow colour.

The latter round, about the size of a large cherry, either yellow or red. It is a native of South America, flowering from July to September.

The second species has an annual root: the stem stiffish: the leaves a hand in length, and blunt: the fruit red, large, depressed, so deeply furrowed as to be in a manner cut into lobes, hard: the branches diffused: the leaves ovate-oblong, sinuate-repand: the flowers solitary and violet. It is a native of China.

The third has an annual stem, thick, twisted, two feet high, with the branches reclining: the leaves ovate, sinuate, large, few, scattered, on thick petioles: the flowers pale violet; peduncles axillary, thickened, bent down, one-flowered, most commonly solitary, but not unfrequently two or three together: the berry large, shining, two-celled, many-seeded, esculent. It is a native of Asia, Africa, and America.

There are varieties with oblong violet-coloured fruit, with an oblong white large fruit; with a globular violet-coloured fruit, and with a globular white or variegated fruit.

The fourth species has a perennial root, woody, according to Dr. Beddoes, smelling like the Potatoe: the stem shrubby, roundish, branched, twisted and climbing to the height of several feet: the leaves alternate, petioled, ovate-lanceolate, quite entire, smooth, soft, veiny; the lower cordate, the upper more or less hastate: the flowers in racemes or cyme-shaped panicles, but not properly in cymes, opposite to a leaf or terminating, nodding, very elegant, purple with two green dots at the base of each segment, and the segments reflexed: the berries elliptic, scarlet, very juicy, bitter and poisonous. It is a native of Europe, Africa, &c. flowering in June and July.

There are varieties with flesh-coloured, with white flowers, and with variegated leaves.

The fifth is an unarmed tree, above the height of a man, with a trunk as thick as the human arm: but according to Miller it only rises with a smooth shrubby stalk six or eight feet high, covered with a brown bark, and divides into many branches, which have spear-shaped leaves three inches and a half long and an inch and half broad; they have a few sinuated indentures on their edges, and end in acute points; they are smooth, and of a light-green colour: the flowers are produced in small umbels from the sides of the stalks, standing erect; they are pretty large, white, and the petal is cut into five star-pointed segments. It is a native of America.

The sixth rises with a strong woody stalk four or five feet high, and divides into many slender stiff branches, having spear-shaped leaves turning backward: the flowers are white, and grow in small umbels, or singly on the side of the branches, to which they sit close; they appear from June to September, and are succeeded by berries as large as small cherries, which ripen in winter. It is a native of the island of Madeira.

There are varieties with red, and with a yellowish fruit.

The seventh has the stems angular, erect, rugged: the leaves oblong, decurrent into the petiole, veined, smooth, rugged beneath, pinnatifid: the peduncles branched: the corollas violet-coloured, blunter than in *Dulcamara*, with two greenish spots at the base of each lobe: anthers yellow, shorter than the style: the berries ovate. It is a native of Peru, flowering in July.

The eighth species rises with a prickly herbaceous stalk three or four feet high; the spines are strong and crooked; the leaves are large, angular, woolly, and armed with the like spines; the flowers are produced in bunches from the side of the stalks; they are of a pale blue colour, and are succeeded by yellow fruit, the shape and size of a Catherine Pear inverted. The plant is annual here. It grows common in all the West India Islands, where it is called Bachelor's Bear.

The ninth has the stem shrubby, two or three feet high, sending out several woody branches armed with short, strong, yellowish spines: the leaves an inch and half long, and an inch broad, woolly on both sides, and angularly indented, armed with spines on both sides along the midrib: the flowers come out in longish bunches from the side of the stalks, and are blue: the berries round, of a gold colour, as large as cherries. It is a native of the East and West Indies.

The tenth species has the stem in a manner shrubby, but yet annual: the leaves rugged, scarcely tomentose, entire at the base, sinuate

with sharpish angles, and spines on the midrib, not at the sides: the racemes longer than the leaves, loose, simple: the berries round, the size of a large pea, yellow when ripe. It is a native of Carolina, flowering in July.

The eleventh has a strong thick shrubby stalk, which rises from two to three feet high, sending out many short thick branches, closely armed with short strong yellow spines on every side: the leaves are about four inches long and two broad; are cut almost to their midrib in obtuse segments, which are opposite, regular, and formed like winged leaves; these segments have several obtuse indentures on their edges; are of a dark green colour, and armed with the same sort of spines as those on the stalks, on both sides: the flowers come out in small bunches on the side of the branches, are blue, appearing in June and July, and are succeeded by round yellow berries, as large as walnuts. It grows naturally at the Cape of Good Hope.

The twelfth species has the stem tomentose, ash-coloured, with thick straight short yellowish prickles, tomentose except at the end: the leaves ovate, shorter on one side of the base, tomentose, thick, blunt; the young ones pinnately sinuate, whitish at the edge, having three prickles on the rib: the petioles are prickly underneath: the peduncles from the side of the stem: the primary pedicel with the calyx spiny, the rest male and unarmed: the corolla, like that of Borage, purplish-blue. It is a native of Palestine.

The thirteenth is well known for its tuberous root: the stem from two to three feet in height, succulent, somewhat angular, striated, slightly hairy, frequently spotted with red, branched; the branches long and weak: the leaves interruptedly pinnate, having three or four pairs of leaflets, with smaller ones between, and one at the end larger than the rest; the leaflets are somewhat hairy, and dark green on the upper surface: the flowers are either white or tinged with purple; or, according to Gerarde, of a light purple, striped down the middle of every fold or welt with a light show of yellowness: the fruit is a round berry, the size of a small plum, green at first, but black when ripe, and containing many small flat, roundish, white seeds. It is probably a native of Peru.

The principal varieties may be distinguished into two kinds—as the red-rooted and white-rooted sorts; the subvarieties of which are extremely numerous; but for garden purposes the following are the most useful:

The Early Dwarf-red—the Round-red—the Ohlong red—the Pale-red—the Blood-red—the Irish-red, or Painted Lord—Old Winter-red—Rough-red—and Smooth-red.

Early Forcing Potatoe—the Early Dwarf-white—Brown Early—Cumberland Early—Early Scot—Golden Dun—Early Champion—White Blossom—Manly White.

Kidney White and Red—Red-nosed—True White—Flat White—Superfine White Early.

Culture.—The three first species, which are annual, may be raised from seed, which should be sown in the early spring on hot-beds moulded over to the depth of six or seven inches with light rich mould, in drills, or pots plunged into the beds. When the plants come up, they should be properly thinned, have a pretty free admission of air, and occasional waterings; and the Love Apple kinds, when they have attained some growth, as five or six inches, and the weather becomes settled warm, should be removed into the open ground, planting them in a warm sheltered border, placing them at a considerable distance. Some may be trained against a south fence to have the advantage of the full sun: they should always be supported by some means or other to show themselves, and ripen their fruit. But the egg plants should be pricked out when a few inches in height into another hot-bed prepared for the purpose, at the distance of four or five inches; and some may be put in separate pots and plunged in the bed, giving water and shade till they are fresh rooted: the waterings should be duly repeated, and fresh air freely admitted when the weather is fine: it may also be requisite to remove them with balls about their roots on to a third hot-bed in order to have them very fine and strong: the frame should be raised as they advance in growth, and when the weather becomes fine and hot they should be gradually hardened, and finally set out in the pots, &c. where they are wanted.

The fourth sort may be increased by layers and cuttings, which may be laid down or planted out in the autumn or spring, where they will be well rooted by the following autumn, when they may be taken off and removed into nursery-rows, or where they are to grow.

The eight following sorts may be increased by seeds, which should be sown thinly in rich light earth in the early spring in small pots, plunging them in the hot-bed under frames and glasses, watering them frequently, when the plants will soon come up, admitting fresh air daily; and when the plants are about two inches high, they should be pricked out upon another hot-bed, giving water and shade till they are fresh-rooted; and some may be put into pots, plunging them in the bed. As the warm weather advances, they should be gradually hardened to the open air, so as to be set out into it about the middle of the summer.

d as other
ping one set in each hole as you go on, and striking the earth over them.

ong other
The surface of the ground should afterwards be raked perfectly even.

ed for the
Drill-planting.—In this mode the drills may be formed either with a large hoe, two feet asunder, and four or five inches deep, in which drop the sets, a foot asunder, and cover them in with the earth equally the depth of the drill.

last sort is
lent root,
Potatoe.
se plenti-
arly sorts
often af
June and
grounds;
o continue
ter end of
when the
n the roots
and being
housed in
good per-
ing, until
following
with suc-
light in a
situation,
tered light
not, either
forming a
kewise be
is from
February
ts, for for-
ter end of
the general
in April,
especially
and much
sets, more
ases of ne-
, they may
n in May,
the recep-
ep.
ormed by
a spade,
n, &c. in
en inches
an four or
ned either
nted at the
five inches
ned, drop-

Holing-in planting.—This is performed with a spade. A man having a light handy spade, and beginning at one end of the line, takes out a spit of earth, forms a small aperture four or five inches deep, another person directly following after drops a set in the hole, the earth of the next spit immediately covers it up, and so on to the end.

Furrow-planting.—This is performed by the spade, by turning over or taking out a spit of earth all along, putting in the dung, and then dropping the sets in the furrow immediately upon it, and with the next spit turning the earth in upon the sets of the first; and in another furrow, two feet from this, dropping another row of sets, which are covered in as above, and so on till the whole is finished.

Trenching-in.—This is sometimes practised in light ground, and is effected as the person proceeds in digging or trenching the ground, being trenched in the common way, each trench two spades wide, and one spade deep, placing one row of potatoes in each trench: beginning at one end of the ground, opening a trench the proper width and depth, as above, then paring in the top of the next trench deeply, putting it with some good dung in the bottom of the first, levelling it evenly, then digging along about half the width of the next or second trench, turning the earth into the first upon the dung, only two or three inches in depth, and upon which lay the potatoe-sets in a row along the middle a foot or more asunder; then digging along the rest or whole width of the said second trench a moderate spade deep, turning the earth of it into the first trench, over the sets, three or four inches deep; this done, dung the bottom of the open trench, and proceed with the digging and planting as before; and thus continue trench and trench to the end.

Bedding-in.—This is sometimes done in low wettish land, for the sake of raising the beds, and sinking the alleys deep enough to drain off the too copious moisture, and is thus performed: The ground is divided into four, five, or six feet wide beds, with alleys two or three feet wide between bed and bed; and the beds being dug, the potatoe sets are placed upon the surface in rows lengthwise; and then the alleys

dug out a spade deep, casting the earth over the sets about three or four inches thick; or the alleys may be first dug out to raise the beds, and the sets then planted with a dibble in the common method: thus by either of these methods, in wet ground, the alleys being sunk, and the beds raised, the alleys drain off the redundant moisture, which might rot the sets before they begin to sprout.

This method of planting is sometimes performed on grass sward, marking out beds as above, with alleys between of proportionable width; then, without digging the beds, the potatoe sets are placed immediately upon the sward, at proper distances; the alleys being then dug and the spits turned grass-side downward upon the beds over the sets, covering them the proper depth as above, in which, if any additional depth is wanted, it may be supplied from the under earth of the alleys; and thus the sets being between two swards, grow, and often are productive of very good crops if permitted to have full growth.

In the after-management where weeds begin to overrun the ground, two or three hoeings should be given to kill them and loosen the surface of the soil; and where the plants have some growth, some hoe up a ridge of earth close to each side of every row of plants in the first or second hoeing, to strengthen their growth more effectually, and render them more prolific, as the bottom of the stalks so landed up generally emitting roots in the earth that become productive of potatoes the same as the principal roots.

In October, when the potatoes are full grown, they should be wholly taken up before they are attacked by frost, and deposited in some dry apartment for keeping: some may however be taken up before for occasional use: this business is usually performed by a three-pronged fork.

When it is intended to raise new varieties from seed, some of the first-flowering plants should be marked, the seed should be gathered in autumn when full ripe, and in the March or April following sown in some light soil, in an open situation, in shallow drills, a foot asunder; and when the plants come up, they should be kept clear from weeds till autumn, when, about the end of October or beginning of November, the roots may be taken up, selecting the finest and largest, which preserve in sand till spring; then plant them in the common way, and by autumn following they will have made proper increase, and attain full perfection; when their properties must be determined.

SOLDANELLA, a genus containing a plant of the low herbaceous perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Primulæ*.

The characters are: that the calyx is a five-parted perianth, straight, permanent; segments lanceolate: the corolla one-petalled, bell-shaped, widening gradually, straight: mouth torn into many clefts, acute: the stamina have five awl-shaped filaments: anthers simple, sagittate: the pistillum is a roundish germ: style filiform, length of the corolla, permanent: stigma simple: the pericarpium is an oblong capsule, round, obliquely striated, one-celled, opening by a many-toothed top: the seeds numerous, acuminate, very small: the receptacle columnar, free.

The species is *S. alpina*, Alpine Soldanella.

It has a perennial fibrous root: the leaves almost kidney-shaped, about three quarters of an inch over each way, of a dark green colour, on long footstalks: among these arises a naked flowerstalk or scape, about four inches long, sustaining at the top two small open bell-shaped flowers, with the brim cut into many fine segments like a fringe: the most frequent colour is blue, but it is sometimes snow-white. It flowers in April, and the seeds ripen in July. It is a native of the Alps.

There is a variety which has all the parts smaller; the petiole is shorter and more slender, and the leaves are not so much rounded, but gradually widen from the petiole.

Culture.—This is increased by parting the roots in the autumn about September, planting them in pots or in a cool shady situation, where the soil is of a moist loamy kind, being frequently watered when the season is dry, and kept from the sun.

The seeds soon after they become ripe may also be sown in pots or boxes filled with the above sort of mould, being placed in the shade, and frequently watered. The plants rise in the spring, and in the autumn following should be removed into separate pots, to have the protection of a frame in winter. They succeed best in a northern aspect.

These plants afford variety among other potted plants.

SOLDIER-WOOD. See *MIMOSA*.

SOLIDAGO, a genus containing plants of the tall, herbaceous, flowering, perennial kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoidæ*.

The characters are: that the calyx is oblong, imbricate, common: scales oblong, narrow, acuminate, straight, converging: the corolla is compound radiate: corollets hermaphrodite tubular, very many, in the disk:—female ligu-



Painted by Syd. Edwards

London Published Mar 11806 by G. Kearnsley Fleet Street.

Engraved by E. Sanford

1 *Solidago stricta*
Willow-leaved Golden Rod.2 *Senecio elegans*
Double purple Groundsel3 *Spartium junceum*
Spanish Broom.

late, fewer than ten, (commonly five) in the ray: proper of the hermaphrodite funnel-form, with a five-cleft, patulous border:—female ligulate, lanceolate, three-toothed: the stamens in the hermaphrodites: filaments five, capillary, very short: anthers cylindrical, tubular: the pistillum in the hermaphrodites: germ oblong: style filiform, length of the stamens: stigma bifid, spreading:—in the females: germ oblong: style filiform, length of the hermaphrodite: stigmas two, revolute: there is no pericarpium: calyx scarcely changed: the seeds in the hermaphrodites solitary, obovate-oblong: seed-down capillary:—in the females very like the others: the receptacle flattish, naked.

The species cultivated are: 1. *S. Virgaurea*, Common Golden-rod; 2. *S. Canadensis*, Canadian Golden-rod; 3. *S. altissima*, Tall Golden-rod; 4. *S. Mexicana*, Mexican Golden-rod; 5. *S. viminea*, Twiggy Golden-rod; 6. *S. bicolor*, Two-coloured Golden-rod; 7. *S. rigida*, Hard-leaved Golden-rod; 8. *S. cæsia*, Maryland Golden-rod; 9. *S. flexiculis*, Crooked-stalked Golden-rod; 10. *S. sempervirens*, Narrow-leaved Evergreen Golden-rod.

The first has a perennial root, of long simple fibres: the stem very various in height, from ten inches to three feet, commonly branching into a panicle, more or less flexuose, never entirely stiff and straight, leafy, angular, striated, a little downy; at the base round and often purple: the leaves elliptic-lanceolate, somewhat rugged, and stiffish; those next the root wider, on longer petioles, and more widely serrate; stem-leaves for the most part indistinctly crenate-serrate, sometimes almost quite entire, varying in size, often recurved; the upper ones gradually diminishing into lanceolate downy bracts: all somewhat hairy, or covered with short stiff down, paler underneath; footstalks winged: the flowers in terminating and axillary erect clusters or corymbs, forming a dense leafy pubescent panicle, which varies extremely as to luxuriance and number of flowers; in a barren soil and on mountains being shorter, more dense and less compound. They are of a golden colour. It is a native of Europe, Siberia, and Japan, flowering from July to September. It has sometimes the names of Wound-wort and Aaron's rod.

There are several varieties; as the purple-stalked broad-leaved, which has the stalks stiff, purplish brown, two feet high: the panicles axillary and terminating; each flower on a long slender footstalk, pale yellow, appearing at the beginning of August: the leaves lanceolate, almost four inches long, and a quarter of an inch broad, deeply serrate, pale green beneath.

The Common Golden-rod, which has the lower leaves ovate-lanceolate, two inches long and an

inch broad, slightly serrate, on pretty long footstalks: the stems slender, a foot and half high; with small, narrow, entire, sessile leaves: the flowers in panicked bunches, clustered together, forming a thick erect spike, appearing in August and September. The narrow-leaved, which has the stalk round, smooth, a foot and half high: the leaves narrow-lanceolate, an inch and quarter long, and an eighth of an inch broad, almost entire, sessile: the flowers in small clustered bunches from the axils, to which they sit very close; and the stalk is terminated by a roundish bunch. The Dwarf Golden-rod, which has the lower leaves indented: the stalk seldom more than a foot high, branching out almost from the bottom: the branches terminated by short, clustered, erect spikes: the leaves on the stem and branches very narrow, acute-pointed and entire. The Welch Golden-rod, which has the lower leaves narrow-lanceolate, an inch and half long, and a quarter of an inch broad, smooth, slightly serrate, a little hoary on the under side: the stalk about six inches high, with the same sort of leaves on it, only smaller: the flowers in roundish clustered terminating spikes, much larger than those of the common sort, and appearing five or six weeks earlier in the season.

The second species has the stalks round, smooth, and two feet high; the leaves narrow and rough, with three longitudinal veins, two inches and a half long, and a quarter of an inch broad in the middle, sessile, ending in acute points, and having sometimes a few slight serratures: the flowers in a roundish terminating panicle, the lower spikes of which are reflexed, but those at the top erect and joined very close. These appear in July. It is a native of Canada.

The third has the stems numerous, straight, rigid, from three to four feet and a half high, the thickness of a straw or more at the base, round, slightly streaked, hirsute, clothed from top to bottom at short distances with leaves, which are widish, oblong, pointed, rough, at their upper and lower parts thinly crenate, in the middle serrate, the serratures minutely crenate; those on the upper branches not serrate, but only minutely crenate; they are green on both sides, with a few oblique veins, and are hairy along the nerve and veins at the back, but without hairs every where else: the flowers very many, on the upper branches, in long rod-like spikes, somewhat reflexed, having four, five, or six florets in the ray: they appear in August and September. It is a native of New England, Virginia, and Carolina.

There are several varieties; as the Tallest Golden-rod—the Hairy Golden-rod—the Recurved Golden-rod—the Virginia Golden-rod.

The fourth species has oblique stalks, a foot

and half high, smooth, with a brown bark : the leaves smooth, spear-shaped, entire, three inches long, and three quarters of an inch broad : the flowers come out on branching footstalks on the side of the stalks, are ranged on one side, and have a few small leaves under the flowers, which appear at the end of August. It is a native of North America.

The fifth has smooth erect stalks, a foot and half high : the leaves narrow, smooth, entire, dark green : the flowers in close compact panicles at the top of the stalk ; spikes short, clustered : the flowers large, bright yellow, appearing in September. It is a native of North America.

The sixth species has the lower leaves oval, six inches long, and three broad, ending in acute points, serrate, having several strong longitudinal veins on long footstalks which have leafy borders or wings : the stalks a foot and half high, branching out almost from the bottom, garnished with small, spear-shaped, entire leaves : the branches grow erect, are closely furnished with small leaves below, and are terminated by short close spikes of white flowers ; or rather, having a yellow disk and a white ray, in close racemes. It is a native of North America, flowering in September.

The seventh has the stalks two feet high : the lower leaves ovate, stiff, smooth and entire, four inches long, and two inches and a half broad, on footstalks four inches in length ; those on the upper part of the stalk are spear-shaped, entire, and embrace the stalk half round : the flowers in loose, spreading, terminating panicles ; spikes short, clustered, bright yellow, appearing in August. It is a native of New England.

The eighth species has the stalk slender, smooth, a foot and half high : the leaves narrow-spear-shaped, two inches long, and half an inch broad, indented on their edges, and ending in acute points : the flowers in a loose terminating panicle, with the spikes closer and thicker towards the top. It is a native of Maryland, flowering in September.

The ninth has the lower leaves four inches long, and almost two broad ; their footstalks two inches long, having a membrane or wing on each side : the stalk rises two feet high ; they are slender, smooth, and of a light purple colour : the leaves ovate-lanceolate, indented, near two inches long, and three quarters of an inch broad, of a pale green on their under side : the flowers are produced in short bunches from the axils almost the whole length ; the lower spikes are an inch long, but the upper ones are almost round : the flowers are of a brimstone colour, and appear late in August. It is a native of Canada.

The tenth species is remarkable for its red stalk, higher than a man, with very smooth and

somewhat fleshy leaves, a little rugged at the edge, continuing the whole winter ; it flowers very late, so that in the Northern countries the frost commonly prevents them from opening. It is a native of North America.

Culture.—These plants are all readily increased by slipping or parting the roots, and planting them out in the autumn or winter soon after their stems decay, or very early in the spring before they begin to shoot ; but the former is the better season, in the places where they are to grow : they succeed in almost any soil or situation, and afterwards require only to be kept clean from weeds, and to have the decayed stems cut down when they begin to decay in the autumn. When they have increased considerably in the roots, they should always be slipped as above.

In planting out they require much room, as they spread considerably.

They afford considerable variety and ornament in larger borders and clumps.

SOLOMON'S SEAL. See *CONVALLARIA*.

SOPEBERRY. See *SAPINDUS*.

SOPEWORT. See *SAPONARIA*.

SOPHORA, a genus containing plants of the herbaceous, flowery, perennial, and shrubby exotic kinds.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are : that the calyx is a one-leaved perianth, short, bell-shaped, gibbous at the base above : mouth five-toothed, oblique, obtuse : the corolla papilionaceous, five-petalled : standard oblong, gradually wider, straight, reflexed at the sides : wings two, oblong, appendicled at the base, length of the standard : keel two-petalled, with the petals conformable to the wings, the lower margins approximating and boat-shaped : the stamens have ten filaments, distinct, parallel, awl-shaped, length of the corolla within the keel : anthers very small, rising : the pistillum is an oblong germ, cylindrical : style size and situation of the stamens : stigma obtuse : the pericarpium is a legume very long, slender, one-celled, knobbed at the seeds : the seeds very many, roundish.

The species cultivated are : 1. *S. tetraptera*, Wing-podded Sophora ; 2. *S. microphylla*, Small-leaved Shrubby Sophora ; 3. *S. alopecuroides*, Fox-tail Sophora ; 4. *S. australis*, Blue Sophora ; 5. *S. tinctoria*, Dyer's Sophora ; 6. *S. alba*, White Sophora ; 7. *S. tomentosa*, Downy Sophora ; 8. *S. occidentalis*, Occidental Sophora ; 9. *S. japonica*, Shining-leaved Sophora ; 10. *S. capensis*, Vetch-leaved Sophora ; 11. *S. aurea*, Golden-flowered Sophora ; 12. *S. myrtillifolia*, Round-leaved Sophora.

The first is a magnificent tree, displaying its pendulous branches of large golden flowers in May and June. It is a native of New Zealand.

The second species is a smooth tree, with small leaves almost wedge-shaped; the flowers large and yellow; the legume compressed, torulose, flat at the back and belly, keeled at the sides with longitudinal membranes. It is a native of New Zealand, flowering in May and June.

The third has a perennial creeping root, from which arise several erect stalks from three to four feet high: the leaves unequally pinnate: the flowers pale blue and small, in long axillary spikes standing erect close to the stalk: they smell sweet. It is a native of the Levant, flowering in July and August.

The fourth species has a herbaceous stem, most commonly decumbent: the leaves cuneate-oblong, smooth, yellowish green; the stipules ensiform, longer than the shortest petiole; the flowers are blue. It is a native of Carolina, flowering in June and July.

The fifth has a perennial root, from which arise several stalks about a foot and half high, sending out from the bottom a great number of small branches: the flowers come out towards the end of the branches in short spikes; are yellow and appear in July. It is a native of Barbadoes and Virginia.

The sixth species has the stem even, high, dark purple: the leaves, like those of Laburnum, even, elliptic, smooth on both sides, an inch and half long: the stipules scarcely any: the raceme a foot long, pendulous: the flowers white, the size of those of Laburnum. It flowers in June, and is a native of Virginia and Carolina.

The seventh species has a downy stem, six or seven feet high: the leaves unequally pinnate, composed of five or six pairs of leaflets: the flowers in short loose axillary spikes, large and yellow, not unlike those of Spanish Broom, void of scent: the pods larger, woolly, five or six inches long, having four or five large swellings, in each of which is a roundish brown seed as big as a pea. It is a native of Ceylon.

The eighth is a shrub, with a round hoary-pubescent stem, and round spreading subtomentose branches, six or seven feet in height: the leaves on alternate, long, spreading, round, hoary petioles, thickened at the base: leaflets opposite, mostly six-paired with an odd one, entire, flat, hoary, white tomentose beneath, on short round petioles: the flowers in a sort of spike: the peduncle terminating, erect, a foot long, simple, round, many-flowered: flowers close, biggish, peduncled, yellow. It is a native of the West-Indies; flowers there in May and June.

The ninth species has the branches round, even, purplish: the leaves alternate, unequally

pinnate: leaflets subopposite, on very short petioles, oblong, blunt with a point, quite entire, glaucous beneath, smooth, spreading an inch long: the flowers on panicle racemed branchlets, of a white colour. It is a native of Japan.

The tenth is a tender pubescent shrub, when more advanced in its wild state naked: the leaves alternate, unequally pinnate: leaflets twenty-three, narrow-lanceolate, equal, quite entire, shining above, subtomentose beneath: the raceme terminating, composed of white recurved flowers. It is a native of the Cape.

The eleventh species is a shrub the height of a man: the root has the smell and taste of liquorice: the stem upright, round, tubercled, gray: branches alternate, spreading, like the stem: the leaves alternate, unequally pinnate, spreading, eight inches long: petioles round on one side, channelled on the other, pubescent: the leaflets from twelve to fifteen pairs, opposite, on short petioles, those of the outmost longer, quite entire, one-nerved, bright green, paler beneath, spreading very much, flat: the stipules linear, acute, pubescent, brownish, erect, permanent: the racemes axillary, solitary, peduncled, spreading, bracted, pubescent, four or five inches long: the flowers alternate, nodding, yellow, eight or nine lines in length, on round pedicels jointed at the top. It is a native of Africa, and flowers there in July.

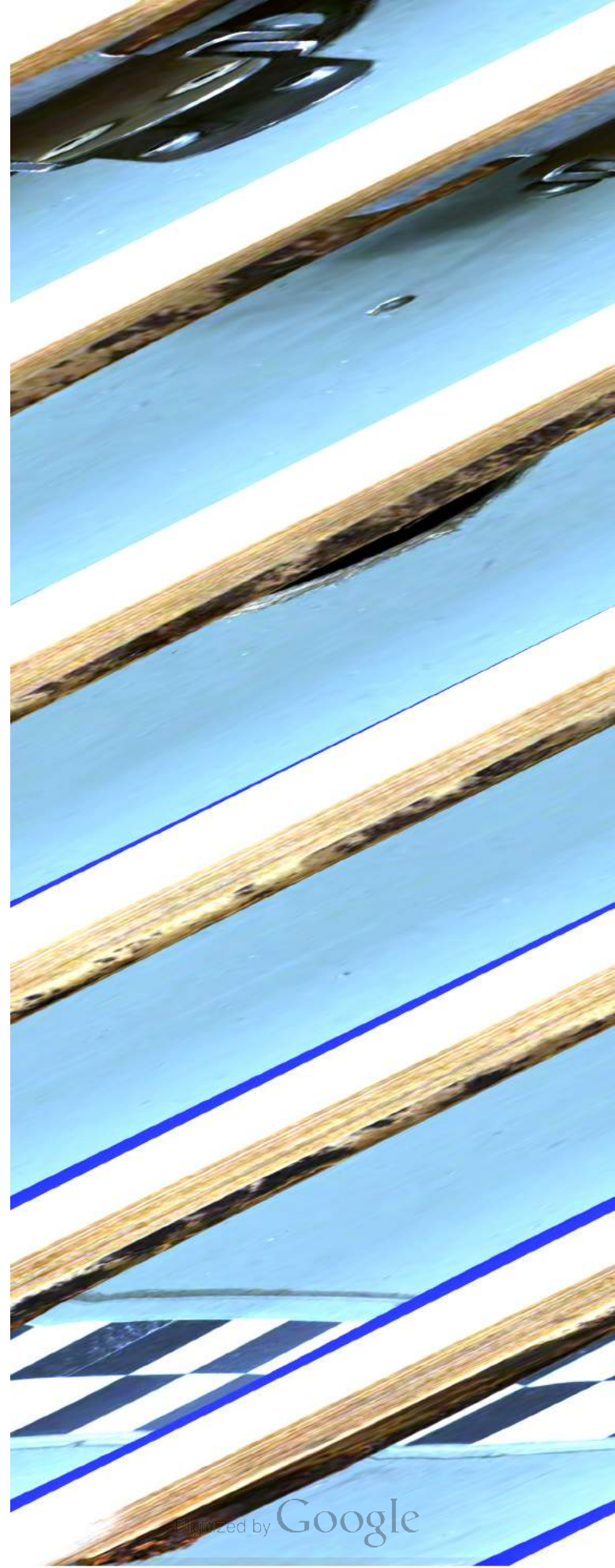
The twelfth has a shrubby, round, leafy, even stem: the branches almost upright, tomentose, somewhat angular towards their tops: the leaves scattered, on short petioles, ten lines long, and four broad, quite entire, rounded at the end with a reflexed point, grooved above and keeled beneath, coriaceous. On each side of the petiole an awl-shaped tomentose stipule, twice as long as the petiole: the flowers towards the end of the branches from the axils of the leaves, solitary, on peduncles the length of the adjacent leaf, white-tomentose; seldom two-flowered. It is a native of the Cape, flowering from November to January.

Culture.—The first five sorts are hardy, and may be increased by seeds or parting the roots.

The seeds should be sown in the spring in pots of fine mould, and when the plants are come up they should be removed into separate pots, till they have obtained sufficient strength, when they may be planted out where they are to grow.

The roots may likewise, in many of the sorts, be parted at the same season and planted in pots, or where they are to remain.

The first and second sorts may also be raised from cuttings and layers, planted or laid down at the same season. These, when planted against a wall, so as to be protected from frost in winter, succeed very well.



All the other sorts are tender, and require the hot-house or stove. They are increased by sowing the seed in the early spring, in pots filled with fine mellow light mould, and plunged in the hot-bed under glasses, or in the bark-bed. When the plants have advanced a little in growth, they should be removed into separate pots, filled with soft loamy mould, being well watered and replunged in the bark-bed till fresh rooted; being afterwards managed as other exotic stove plants, with but little water. They likewise sometimes succeed by layers and cuttings, treated in the same manner.

The first sorts afford variety in the borders and among potted plants, and the latter in stove collections.

SORB TREE. See *SORBUS DOMESTICA*.

SORBUS, a genus containing plants of the ornamental tree kind.

It belongs to the class and order *Icosandria Trigynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved perianth, concave-spreading, five-cleft, permanent: the corolla has five petals, roundish, concave, inserted into the calyx: the stamina have twenty awl-shaped filaments, inserted into the calyx: anthers roundish: the pistillum is an inferior germ: styles three, filiform, erect: stigmas headed: the pericarpium is a soft globular berry, umbilicate: the seeds three, somewhat oblong, distinct, cartilaginous.

The species cultivated are: 1. *S. aucuparia*, Mountain Service, Mountain Ash, Quicken Tree, Roan Tree: 2. *S. domestica*, True Service or Sorb; 3. *S. hybrida*, Bastard Service, or Mountain Ash.

The first is an elegant tree, of slow growth; the wood tough and close-grained, not very hard; the bark smooth and gray; the young branches purplish brown; the leaves unequally pinnate: leaflets (five, six, seven or eight pairs) serrate except at the base, smooth above, and nearly so beneath, except a few fine scattered hairs; their under side is also glaucous: they are sessile, lanceolate; the middle ones longest, and the odd one is rather oblong-ovate: the midrib is channelled, and often purple. And, according to Miller, the leaves on the young trees in the spring are hoary on their under side, but about midsummer the hoariness goes off, and those upon the older branches have very little at any season: the flowers are in large, terminating, pubescent corymbs, very much branched: the fruit bright red or scarlet when ripe, nearly round, the size of a large pea, juicy, with an astringency. It is a native of the colder parts of Europe, &c.

The leaves make a pretty variety when mixed

with other trees in plantations: it is also handsome when in flower, and in the autumn, when in fruit; but the blackbirds and thrushes are so fond of it, that they devour it before it is well ripe.

The second species is a tree of a middling size, not unlike the first, of very slow growth, not flowering till it arrives at a great age; the wood is very hard: the leaves alternate, composed of from six or seven to nine pairs of opposite, sessile, ovate or oblong, equal leaflets, with a terminating one of the same size; all entire at the base, serrate from about half way to the end, smooth above, downy beneath, but that downiness goes off towards autumn: the flowers in terminating panicles, subcorymbed, tomentose: the fruit pear-shaped, reddish and spotted, extremely austere, and not eatable till it is quite mellowed by frost or time, when it becomes brown and very soft. It is a native of the warmer parts of Europe, flowering in May.

There are varieties in the fruit: as with apple shaped fruit; with pear-shaped fruit; with oval fruit; with turbinate fruit; and with compressed fruit.

The third is a middle-sized tree: the leaves lobed in front, pinnate at the base, serrate, without any stipules, smooth above, white-tomentose beneath: the corymbs terminating, tomentose, many-flowered: the flowers white: the styles three, or sometimes two only: the fruit as in the first, but a little larger.

Culture.—These plants are all capable of being raised from seed, and also by layers; but the first is the best method.

The seeds, when well ripened in the autumn, should be sown on small beds of light fine ground in the nursery, either in drills or over the surface, covering them in to the depth of about an inch. When the plants rise in the following or second spring, they should be kept clear from weeds, and when of a year's growth, be planted out in nursery-rows, to remain till of a proper size for planting out.

The second sort is sometimes sown in large pots and forwarded in a hot-bed, so as to be sooner fit for planting out in nursery-rows.

In the layer method, some of the best trees should be cut down near to the ground while young, by which young shoots will be sent off, which should be laid down in the usual way in the autumn or spring season, where they readily strike root, and become proper for being planted out in nursery-rows in one year. In order to continue any particular variety, this method must constantly be adopted.

In cultivating the second sort for the purpose of fruit, the best method is by grafting or budding upon stocks of any of the sorts raised as above, or upon pear stocks.

These trees in rearing should be trained for standards, each with a single upright stem, in the nursery, till from three to six or eight feet high, when they are proper for any plantation, and may be transplanted as required.

They may be introduced in any large shrubbery or other ornamental plantation, and in those of forest-trees. Some of the domestic Services may also be introduced as fruit-trees in gardens and orchards, principally as standards, but occasionally in espaliers, &c. in both of which they should be planted and managed as apple- and pear-trees, permitting the standards to shoot freely above into full heads; the others being regulated according to their order of training. They will produce plentiful crops of fruit annually, after some time, to gather in autumn. In gathering of which for the table, it is proper to lay some in the fruiter, &c. a little time, to mellow, become soft and tender, in which state it is eatable, and of an agreeable taste and flavour.

SORREL. See **RUMEX**.

SORREL TREE. See **ANDROMEDA** and **RUMEX**.

SOUR GOURD. See **ADANSONIA**.

SOUR SOP. See **ANNONA**.

SOUTHERNWOOD. See **ARTEMISIA**.

SOUTH-SEA TEA. See **ILEX**.

SOW-BREAD. See **CYCLAMEN**.

SPANISH BROOM. See **SPARTIUM**.

SPANISH ELM. See **CORDIA**.

SPANISH POTATOES. See **CONVOLVULUS**.

SOUP HERBS, such as are made use of in soups and other culinary preparations. Various sorts of herbaceous vegetables are in estimation for this purpose, a list of which may be useful in assisting the memory in furnishing the garden with the proper sorts; but under the denomination of Soup Herbs, all the sorts of Pot-herbs used occasionally in soups and broths, &c. are included, as well as several sorts used as Salad-herbs.

The principal sorts are: Celery, Endive, Leeks, Lettuce, Spinach, Green and White Beet, Chard Beet, Orach, Borage, Bugloss, Burnet, Chervil, Sorrel, Parsley, Coriander, Pot-Marigold, Thyme, Winter Savory, Summer Savory, Pot or Winter Marjoram, Sweet Marjoram, Spear-Mint, Tarragon, Basil, Love-Apple or Tomatoes.

In all of which, except the Marigold and Love-Apple, the leaves are the only useful parts; but in the Marigold the flowers are the only part used, and in the Love-Apple the fruit. All the sorts, except the last two, (Basil and Love-Apple) are of a hardy temperature, and may be easily raised in the natural ground; and the greater part are biennials and annuals, that re-

quire to be raised from seed every year; but the Thyme, Winter Savory, Pot or Winter Marjoram, Sorrel, Mint, Burnet, and Tarragon, are perennials of many years' duration, being raised in some sorts both by seeds and slips, but in others principally by slips; and the Basil and Love-Apple, being tender annuals, require to be raised from seed in a hot-bed. See the *Cultures of the different sorts*.

SOWING OF SEEDS, the practice of putting seeds into the ground; in which different methods are made use of, according to the sorts: as Broad-cast sowing and raking-in, Drill-sowing, Bedding-in sowing, &c.

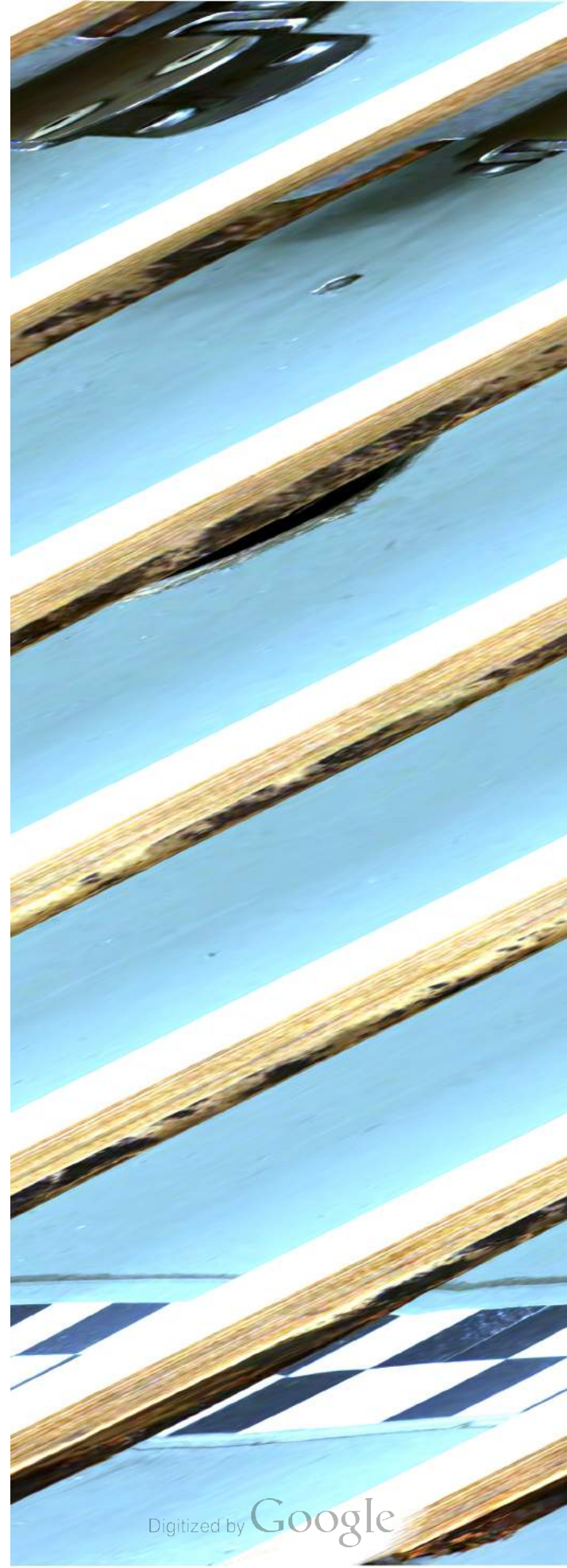
The first is the most common and expeditious method of sowing, both for many of the principal crops to remain, and for transplantation; and is performed by sowing the seed with a spreading cast evenly all over the surface of the ground, either in one continued plat or divided into beds, which is immediately raked with a large rake to bury all the seeds a due depth in the earth, some requiring to be raked in as light as possible, others half an inch or an inch or more deep, according to their sizes, &c.

In preparing for this method of sowing, the ground is previously dug over in the common way, making the surface level with the spade as the work proceeds, and, according to the nature of the seed, sowing it as soon as possible afterwards.

This sort of sowing should generally be performed in dry weather, particularly the early sowings in winter and spring; but in hot weather, in summer and autumn, it may often be eligible to take advantage of sowing immediately after a shower or moderate rain.

As to the sowing the seed in the Broad-cast way, it is effected occasionally both with an open and locked hand. In the former case, it is performed by delivering the seeds with an open hand, and broad-spreading cast, as practised in sowing corn in the open fields, previously stepping out the ground in breaks, or certain widths, as a guide to sow with the greater regularity; proceeding with the sowing along each space with a regular step and cast, giving the hand a proper sweeping cant forward, fully expanded at the delivery of the seeds, making them spread abroad evenly in every part; and thus proceeding up one space and down another till finished; which method is practised in large kitchen grounds in sowing any considerable space in one continued plat.

But the latter is practised occasionally, both in sowing large continued plats of ground, and narrow beds, &c. but more generally the latter; especially when intended sowing them bed and bed separately, or on narrow borders, and other



small plats of ground, commonly sowing or delivering the seeds with a locked or close hand, discharging them from between the fore-finger and thumb, opening or pinching the thumb more or less, according to the size and nature of the seeds and thickness they require to be sown, giving the hand a sort of jerking turn, or cant forward, at the delivery, to cause the seeds to spread regularly.

As soon as the seeds are sown they should be directly raked in, before the surface of the ground is rendered either too dry by the sun or wind, or made too wet by rain, in a regular and even manner, so as to bury them sufficiently according to their kinds, all large stones, lumpy clods, and rubbish being cleared off; smaller or larger rakes being used, as they may be necessary. See RAKE.

But previous to the raking in the seeds sown on the general surface in one continued space, where the ground is loose, light, and dry, and in a dry season, it is sometimes the practice, after sowing, to tread them in evenly by treading the ground all over lightly and regularly with the feet. It is also sometimes proper to pare up the loose earth of the alleys an inch or two deep, and spread it thinly over the surface. The work of treading in the seeds is performed with the feet nearly close together, taking short regular steps, treading the surface all over, once in a place, with but small spaces between the steppings.

But in extensive market kitchen-gardens, where large tracts of ground are sown at once, instead of raking in the seed, they, for the sake of expedition and cheapness, have light short-tined harrows to draw with men, with which they harrow in the seeds; and sometimes in light dry ground, and a dry surface, they afterwards roll the ground with a light wooden roller, to close and smooth the surface over the seeds more effectually, performing it when the surface is a little dried so as not to adhere to the roller. And in large garden-farms in fields, where they commonly plough and harrow the ground for the reception of the seeds, they practise only the Broad-cast sowing in continued tracts for almost all their esculent seeds, except peas, beans, and kidney-beans; the ground being prepared by ploughing, and afterwards rough-harrowed, to smooth the surface moderately, the seeds being then sown in the spreading open-handed manner, and harrowed in either with a light short-toothed horse-harrow, or by men for particular crops; when, if very dry weather, they roll the surface afterwards with a wooden roller, drawn by horses, &c. to smooth the surface.

The second method of sowing is necessary for many sorts of seeds, both esculent, flower, tree and shrub kinds in the nursery, both for the plants to remain where sown, and for

transplantation, which is performed in drills from a quarter or half an inch, to two or three inches deep, according to the sizes and sorts of seeds, which being sown evenly along the bottom of the drill, the earth is drawn evenly over them with a hoe or rake, the depths as above, and the surface lightly raked smooth. This mode is always proper for large kinds of seeds, such as peas, beans, kidney-beans, and many large kinds of tree and shrub seeds, nuts, and berries; it being not only the most ready method of committing those large seeds to the ground the proper depth, but, by being in rows at a distance, best suits the nature of the growth of these sorts of plants and their methods of culture. Many kinds of small seeds are also the most conveniently sown and cultivated in drills; such as several of the kitchen-garden plants, as parsley, chervil, coriander, all the sorts of small-salading, and sometimes spinach, beet, &c. also some of the aromatics, when designed as edgings; and also occasionally in rows in beds, both to remain and for transplanting, such as thyme, savory, hyssop, &c. likewise many sorts of flower-seeds for transplantation, and sometimes to remain. It is performed by drawing the drills with a common drawing-hoe, larger or smaller, in proportion to the sorts of seeds to be sown, setting a line as a guide to draw the drills straight by, which are drawn of different depths, as the sorts and sizes of the seeds may require, and at proportionable distances, from three or four inches to as many feet, according to the nature of the plants. Sometimes, when very small drills are required for fine or small seeds, to be sown in a bed, border, or hot-bed, it is done with the end of the finger, or with the end of a small flat stick.

The seeds should in general be sown and covered in directly, if the ground is dry and in good order; but if the soil is wet, especially at an early season, it may be proper to suffer the drills to lie open exposed to the sun and air an hour or two, or more, to dry a little, particularly for tender seeds in early sowings, in the full ground. The sowing in the drills is performed for the most part with a locked or close hand, discharging the seeds from between the fore-finger and thumb, scattering them evenly along the bottom of the drill, some sorts requiring to be sown thinly just along the middle, such as in the angular drills drawn corner-ways of the hoe, for peas and many other larger seeds; also sometimes for smaller seeds when intended for edgings; but in the shallow flat-bottomed drills, it is generally intended for the seeds to be scattered evenly the whole width of the drill, thicker or thinner, according to the nature of growth of their respective plants.

The work of covering or turning in the earth in the drills over the seeds, may be performed occasionally both with the rake, hoe, and feet; but the rake or hoe is the most proper for general practice for all smaller seeds, drawing the earth evenly into the drills a regular depth fully to the depth of the drill, whether deep or shallow: however, peas, beans, kidney-beans, and such-like larger seeds in large drills at wide distances, are often covered in with the feet, by slipping them lightly along each side of the drill alternately, turning the earth evenly in over the seeds; the surface being then lightly trimmed along with the rake, to smooth it and clear off large stones, &c.

In the last method, the ground being dug and formed into four or five feet-wide beds, with alleys a spade's width or more between bed and bed, and the earth drawn off the top of the bed with a rake or spade half an inch or an inch or more deep into the alley, the seed is sown all over the surface of the bed; which done, the earth in the alley is immediately, either with a rake, drawn spreadingly upon the bed again over the seeds the same depth, or spread over with a spade, and the surface raked smooth and even in a similar manner.

It is often practised in the nurseries, especially in sowing some large sorts of seeds, as well as others, but not very frequently in kitchen-gardens. It is not so expeditious as the Broad-cast sowing, but is very proper for many sorts of small seeds, and many sorts of the tree and shrub kind, being a very regular method of sowing so as to cover all the seeds an equal depth, and is performed two or three different ways; such as by the rake, by the spade, and by sifting.

It is also sometimes performed with the rake and spade together, particularly when intended to sow any large seeds a good depth, using the rake to shove or rake the earth from off the bed into the alleys; or if it cannot be conveniently performed with the rake a proper depth, it is effected with the spade, trimming or paring the earth evenly off the surface into the alleys; then sowing the seeds all over the surface; and if they are of the larger berry, nut, or stone kind, or any other large seed, previous to covering them, pressing or patting them all evenly down into the earth with the back of the spade; and then, either with the rake or spade, spreading the earth out of the alleys evenly over them; though if it is a deep covering, especially when taken off with the spade, it is most eligible to use the same implement in returning it, being careful to spread it evenly, to cover the seeds all equally a proper depth, smoothing the surface with the rake.

Another method sometimes practised with large seeds is, that when the ground is laid out in beds unraked, the seed is sown on the surface, and with a rake stricken a little into the earth; then with the spade paring the alley, and casting the earth evenly over the bed, half an inch, or an inch or more deep, as may be required, raking the surface even. This is also sometimes practised in wetish ground, at an early season, when it does not readily admit of treading or raking. And by deepening the alleys, and raising the beds, it drains the moisture from the surface.

The method by sifting is sometimes practised for several small or light seeds of a more delicate nature, that require a very light covering of earth when sown; as in order to cover them as shallow as possible, it is done by sifting fine earth over them out of a wire or chip sieve. Before the seed is sown, the surface of the bed, &c. is raked fine; then the earth thinly shoved off the surface of the bed with the back of the rake into the alley, making the surface as smooth as possible, and then sowing the seed, smoothing it down lightly with the spade, and sifting the earth in the alley evenly over it, to a suitable thickness, as half a quarter or a quarter of an inch deep; or sometimes the surface is only raked as smooth as possible, without drawing off the earth, or sometimes lightly smoothed with the back of the spade, then sowing the seed, and letting some loose fine earth from the alley, or some brought for the purpose, be sifted thinly over it.

The modes of sowing the different sorts of seed crops are more fully explained under their respective heads.

SPADE, an useful garden implement, used for digging and preparing the soil for the reception of all sorts of seeds and plants.

There are several sorts and sizes of spades occasionally employed, though the common large digging spade is, in most places, almost commonly used for all kinds of digging and spade-work, which, however, in many instances, cannot be so conveniently used as a middling or small spade; it is therefore eligible for every garden to be furnished with three different sizes of spades, to suit every department of gardening the more commodiously; such as the common Large digging Spade, for all common digging and spade-work; a Middling, and a Small Spade for digging particular narrow compartments, and between small plants closely placed in beds and borders, &c.

The first sort is usually from fourteen to fifteen inches long in the plate, and nine broad, narrowing gradually half an inch or an inch less at the bottom.

The second sort should be about a foot long in the plate, and seven or eight inches broad.

The Small Spade, which is about eight or nine inches long in the plate, and five wide, is convenient in pointing up or slight digging, and in fresh loosening the surface between close-placed small plants, in beds and borders, &c. where neither of the two former spades can be readily introduced: it is also useful in planting and potting many sorts of small plants, taking up small roots, and other light purposes.

And a very Small narrow Spade, having the plate about seven inches long, by three and a half or four wide, is also very useful in small compartments of beds, borders, &c. containing some particular close-placed, small plants of flowers, and others, both in occasionally slightly digging, or loosening the earth between them with greater care and effect, than a larger sized spade; also sometimes in similar compartments in occasionally trimming round the bottom part of some straggling fibrous-rooted plants; and it is also often useful in taking up and transplanting small plants, and taking off root off-sets and slips, in particular sorts, in which a larger spade would not be so convenient. And a Semicircular, or Scooped Spade, is another sort, of a smallish size, having the plate made hollow like a scooped garden-trowel, which is very useful in taking up small plants with balls of earth, to preserve the ball more firmly about the roots.

Proper Garden Spades have the plate wholly of iron, not above a quarter of an inch thick upward, growing gradually thinner from the middle downward; the tree or handle being generally of ash, about two feet long, and an inch and half thick, with a firm open handle at top, formed out of the solid wood, just big enough to admit of taking ready hold.

SPARTIUM, a genus containing plants of the deciduous and evergreen kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianth, cordate-tubular: at the upper edge very short, below towards the tip marked with five toothlets, coloured, small: the corolla papilionaceous, five-celled: standard obcordate, the whole reflexed, very large: wings ovate, oblong, shorter than the standard, annexed to the filaments: keel two-petalled, lanceolate, oblong, longer than the wings, (the carinal margin connected by hairs,) inserted into the filaments: the stamina have ten connate filaments, adhering to the germ, unequal, gradually longer; the uppermost very short; the lower nine-cleft: anthers oblongish: the pistil-

lum is an oblong germ, hirsute: style awl-shaped, rising: stigma growing to the upper side of the top, oblong, villose: the pericarpium is a cylindric legume, long, obtuse, one-celled, two-valved: the seeds many, globe-kidney form.

The species cultivated are: 1. *S. scoparium*, Common Broom; 2. *S. junceum*, Spanish Broom; 3. *S. radiatum*, Starry Broom; 4. *S. monospermum*, White-flowered Single-seeded Broom; 5. *S. sphaerocarpum*, Yellow-flowered Single-seeded Broom; 6. *S. Scorpius*, Scorpion Broom; 7. *S. angulatum*, Angular-branched Broom; 8. *S. spinosum*, Prickly Broom.

The first grows from three to six feet high or more, very much branched; the branches upright, rushy, evergreen, angular, flexible, leafy, smooth except the very young ones which are downy; the leaves ternate, small, ovate, acute, downy and edged with soft hairs bending inwards; the leaf-stalks are also slightly hairy, and flattened: the flowers axillary, solitary or two together, rarely three, nodding, on round smooth peduncles, furnished on each side with a very minute stipule, of a fine yellow colour. It is a native of Europe, flowering in May and June.

There are several varieties, some of which merit a place among flowering shrubs; as that with a purple calyx, and the flowers strongly tinged with orange, as well as that which is very hoary.

The second species has the branches smooth, flexible, eight or ten feet high; the lower ones have small smooth leaves, at the end of the shoots of the same year; the flowers are disposed in a loose spike, are large, yellow, have a strong agreeable odour, appear in July, and in cool seasons continue in succession till September. It is a native of all the Southern countries of Europe.

There is a variety with double flowers.

The third has low stems, with opposite four-cornered branches: the leaves opposite, subsessile: leaflets sessile, thin, subpubescent: the petioles extremely short, but permanent, three-cornered, gibbous, very blunt, thicker than the branchlet to be supported: the flowers terminating, in threes, sessile. In its natural state it is a low shrub; when cultivated it becomes much larger, though rarely exceeding two feet and a half in height, but the branches spread very much and form a large bush; they are angular and pliable, and always come out by pairs opposite: the leaves narrow and awl-shaped, placed round the stalk, spreading out like the points of a star: the flowers in small spikes at the end of the branches, bright yellow, but not

more than half the size of the second sort, and without scent. It flowers in June, and is a native of Italy.

The fourth species has a thick stalk, covered with a rugged bark when old; it rises eight or nine feet high, sending out many slender rush-like branches of a silvery colour, almost taper, which terminate in very slender bending ends; these have a few narrow spear-shaped leaves on the lower branches: the flowers are produced in very short spikes or clusters on the side of the branches; are small and white. It is a native of Spain and Portugal, flowering in June and July.

The fifth has an upright stem: the branches numerous, slender, round, smooth, slightly striated, having a few tubercles scattered over them, below leafless: the leaves on the younger branchlets small, lanceolate, deciduous, silky, with very short hairs pressed close: the flowers small, racemed, each on a very short pedicel. It is a native of the South of Europe and Barbary, flowering in June and July.

The sixth species is a shrub wholly covered with alternate spines, on which the flowers are placed; this renders it quite inaccessible: the branches and leaves are striated and ash-coloured, and the latter are a little villose: the flowers are yellow and rather large. It is a native of the South of Europe and Barbary, flowering in March and April.

The seventh has the stalks and branches slender, having a few trifoliate and single leaves towards the bottom: the branches have six angles or furrows: the flowers small, of a pale yellow colour, produced in loose spikes at the ends of the branches, rarely producing seeds in this climate. It is a native of the Levant.

The eighth species has stalks five or six feet high, sending out many flexible branches, armed with long spines: flowers terminating in clusters, each upon a long pedicel: corolla bright yellow, appearing in June. It is a native of Italy and Spain.

Culture.—The three first sorts are hardy, but the others more tender, especially in their young growth.

They are all capable of being raised from seeds, and the double-blossomed sorts by layers and cuttings. The seeds should be sown in the early spring, as about April; the hardy sorts in beds of common earth, either in drills or by bedding in to the depth of an inch: but in the tender sorts in pots or beds hooped over to protect them in frosty weather. In the following spring they should be removed into nursery-rows or larger pots, according to the kinds, shortening their tap-roots, and setting them out in rows two feet

Vol. II.

apart, at the distance of one in the rows, to remain two or three years, when they may be planted out in the shrubbery, or other places: the tender sorts in pots being removed to the greenhouse or garden for protection in winter, being managed as the hardy sorts of plants of this kind.

The layers should be laid down in the autumn or spring, and the cuttings may be planted out in the spring or summer, some in the open ground, and others in pots plunged in the hot-bed to promote their striking root. They may be managed afterwards as the other sorts.

This is the only certain mode of preserving the varieties.

The hardy sorts are very ornamental in the borders, clumps, and other parts, and the tender kinds in greenhouse collections, and among other more hardy potted plants.

SPAWN, the progeny or offspring of plants or other vegetables; but it is mostly applied to such small offsets, suckers, and sprouts as rise numerously from the roots, &c. of certain plants, serving for the purpose of increase, which, as being parts similar to the whole plant, when separated from the parent vegetable and planted out, readily grow, and commence proper plants, and thereby renew or increase their respective kinds with great facility and abundance.

In a general acceptation, it is, however, more peculiarly applied to the progeny of mushrooms, being an offspring from the root of those fungi, consisting of minute white parts, shooting and running in the earth or dung, like small white thready fibres, assuming the appearance of slender white strings, which are productive of numerous minute white knobs, appearing at first the size of small pin-heads, the whole smelling strong of the mushroom; and those little knobs being infant plants, they gradually increase in size to proper mushrooms, which are quick of growth, and of very short duration; but the same spawn running in the earth, &c. furnishes a plentiful supply of mushrooms from the bottom in regular succession for a considerable time, sometimes several months. See **AGARICUS**.

It may be procured at all seasons of the year, but more plentifully towards the end of summer and in autumn, from the places of its growth; such as old mushroom beds, old horse-dung hot-beds, and horse-dunghills that are moderately dry, and which have remained undisturbed several months; also sometimes in old compost heaps, consisting chiefly of horse-dung; in all of which the spawny substance discovers itself in dry lumps of dung and earth, which lumps should be taken up entire: likewise in stable-yards, where any quantity of horse-dung has lain dry

and undisturbed any considerable time, lumps of spawn are often obtained. It is also found in fine perfection in the horse-rides belonging to great inns, livery-stables, and horse-dealers, especially on the sides next the walls: likewise in horse-mill tracks, where horses are constantly employed in working; also in kitchen-gardens, where any piece of ground has been dunged in the spring, with new, or but moderately-rotted stable-dung, or old dry hot-bed dung, &c.

And sometimes it is produced naturally all over the surface of an old cucumber or melon hot-bed, both in the dung and earth, in autumn or winter, where the frame and lights have been continued over the bed; and where the earth of the bed is of a loamy nature, the spawn is often remarkably fine and strong; for in this kind of earth, of a moderately-light quality, it is generally of a superior quality, and very productive; so as sometimes, in such old beds where the frames and glasses remain, and the surface of the bed is covered thickly with dry straw, litter, or hay, under the glasses, to produce a full crop of good mushrooms towards the spring. See AGARICUS.

Mushroom spawn is also obtained in meadows and pastures towards the end of summer and in autumn, before the rain and cold commences; as in the months of August and September, when the mushrooms rise naturally, serving as a direction to the place where to find it; but that found in the other places is mostly the best.

It is necessary to observe, that there is also a fruitful and barren sort of mushroom spawn; the former is distinguished by the substance of the fibry or stringy white shoots, &c. and mushroom-like smell, as before observed; but in the latter sort, the thready fibres are far more abundant, fine, and downy, often appearing like a fine white down, and, being of no substance, produce only a flash of small white fungi destitute of the fleshy part, and which, by the mushroom-men, is commonly called White-cup.

Methods are sometimes practised to obtain mushroom spawn more abundantly by art, by the effects of horse-dung, both in hot-beds and in compost heaps; sometimes, in the former case, by planting small pieces of spawn, or spawny earth, along the top edge of the later cucumber hot-beds in summer, or in the sides of any horse-dung heaps, having a little warmth remaining; so that the moderate heat of the dung in the bed or heap may set the spawn a-running, so as sometimes to produce a few mushrooms in autumn, and increase it considerably for future use in spawning proper mushroom beds: and in the second case, by a compost of

dung and loamy earth together; procuring in spring, or early in summer, a quantity of fresh horse-dung, consisting of plenty of short stuff, and a due proportion of long; and casting the whole into a heap to ferment a fortnight or a month, that the rank burning vapour may pass away; then having some loamy earth, or other good substantial mould, or any spawny soil from old beds, form the dung into a long narrow ridge, mixing some of the earth occasionally towards the outside; and in a fortnight or three weeks, when the heat becomes quite moderate, covering the whole with dry long litter to defend it from the wet, permitting the whole to remain a considerable time, when good spawn will often be produced.

In collecting it from any of these places, the lumps of dung and earth in which it appears should be taken up as entire as possible, put in a basket, and carried into some dry shed, or other place, till wanted, or it may be immediately used.

SPEARAGE. See ASPARAGUS.

SPEAR-KING'S. See ASPHODELUS.

SPEARMINT. See MENTHA.

SPERAGE. See ASPARAGUS.

SPERMACE, a genus containing plants of the herbaceous, annual, and shrubby kinds.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Stellatæ*.

The characters are: that the calyx is a small four-toothed perianth, superior, permanent: the corolla one-petalled, funnel-shaped: tube cylindrical, slender, longer than the calyx: border four-parted, from spreading reflexed, obtuse: the stamina have four awl-shaped filaments, shorter than the corolla, or standing out: anthers simple: the pistillum is a roundish germ, compressed, inferior: style simple, but cloven above: stigmas obtuse: the pericarpium has two capsules, connate, oblong, gibbous on one side, flat on the other, obtuse; each two-horned: the seeds solitary, roundish.

The species cultivated are: 1. *S. tenuior*, Slender Button-weed; 2. *S. verticillata*, Whorl-flowered Button-weed.

The first grows to the height of two feet and a half: the stalks are stiff, a little angular, and covered with a brown bark; the branches come out by pairs: there are two leaves at each joint placed opposite, two inches long, and almost a quarter of an inch broad; between these come out three or four smaller leaves, which stand in whorls round the stalks; they are smooth, and have one strong nerve or rib in the middle: the flowers grow in slender whorls toward the top of the stalks; are small, white, and sessile,

having a whorl of leaves close under them. It is a native of Carolina and the West Indies, flowering in June.

The second species has a shrubby stem, three or four feet high, sending out a few slender branches, with narrow leaves on them, not so long as those on the first sort; they are smooth, of a light green, and stand in a kind of whorl round the stems, two being larger than the others in each whorl: the flowers grow in thick globular whorls towards the top, and one terminates the stem; they are small and very white. It is a native of Jamaica and Africa, flowering here from June to August.

Culture.—These plants are increased by sowing the seeds on a moderate hot-bed early in the spring, or in pots to be plunged in it: when the plants have attained some growth, they should be removed into separate pots filled with good friable mould, replunging them in the bed.

They should afterwards be managed as other plants of the exotic stove kind.

They afford variety in stove collections.

SPINACIA, a genus containing a plant of the annual culinary kind.

It belongs to the class and order *Dioecia Pentandria*, and ranks in the natural order of *Holotraceæ*.

The characters are: that in the male the calyx is a five-parted perianth: segments concave, oblong, obtuse: there is no corolla: the stamina have five capillary filaments, longer than the calyx: anthers oblong, twin:—female, the calyx is a one-leaved perianth, four-cleft, acute, with two opposite segments very small, permanent: there is no corolla: the pistillum is a round compressed germ: styles four, capillary: stigmas simple: there is no pericarpium: calyx unites and hardens: the seed one, roundish, covered by the calyx.

The species is *S. oleracea*, Garden Spinach.

It has an annual root: the leaves sagittate: the stem hollow, branching, herbaceous, about two feet high: the male flowers are herbaceous, in long spikes; they abound in pollen, which, when ripe, flies out when the plants are shaken, and spreads all round; after which the plants soon decay: the female flowers, which are on a separate plant, sit in clusters close to the stalks at every joint; they are small, herbaceous, and are succeeded by roundish seeds, which in the prickly variety are armed with short acute spines. Its native place is not known.

There are varieties of this, which differ in the size and shape of the leaves, and the more or less prickliness of the seeds;—as the Triangular with prickly seeds: the Round with smooth seeds, which has ovate thick leaves, not angular at

their base; both stalks and leaves are much more fleshy and succulent; and the seeds are smooth without any spines. Of this also there are two or three subvarieties, differing in the shape, thickness, and size of their leaves.

Culture.—In these plants it is effected only by seed, by sowing it every year in spring and autumn; the former furnishing the main spring and summer crops; and the latter the winter, and for early spring use.

The Prickly sort is the best for winter crops, and the Round for the summer ones.

It should be sown at several intervals of time, from January till August, as every month, three weeks, or fortnight, according to the earliness or advanced period of the season, so as to obtain a regular succession most part of the year.

The general spring crop should be sown in March, and the general winter crop about the beginning of August.

In the spring sowings, as the crops in the very early sowings in January run soon to seed, a moderate quantity should only be sown.

But in the autumn sowings, as the plants do not run the same year, good full crops, to stand for winter and early spring use, should be put in.

It succeeds in any common soil of the kitchen-garden; but the richer in dung the better; always choosing an open situation, not too near low spreading trees, &c., as it never succeeds in close or shady places, in which it is always drawn up weak, and soon runs to seed, without attaining perfection: a warm border may be proper for the early crops; but for the main crops in general, the open quarters are the most suitable, though a broad warm-lying border may also be proper for some part of the later sown winter-crops occasionally, for the purpose of having the advantage of a little shelter of the fence, and benefit of the sun during the winter season; and fresh seed should be procured for each sowing; as this will be found of great importance in the free growth of the plants: for the autumn sowings of the winter crops, it is of advantage to procure new seed of the same year.

After the ground has been dug, the seed may either be sown broad-cast, and raked in, or in shallow drills a foot asunder; though broadcast is the most expeditious, and probably the most proper method for the growth of the crops, in the product of large full leaves; sowing it all over the surface moderately thin, either in one continued plat, and trodden down evenly, if light ground, and raked in with a large rake or light harrow; or the ground may be divided into four- or five-feet-wide beds, with foot-wide alleys between; especially for the early and winter

crops in moist ground; the seeds being sown as above, raking them in evenly: drill-sowing may also be occasionally practised, drawing the drills with a hoe flatways, near an inch deep, and ten or twelve inches asunder, scattering the seeds thinly along them, raking the earth over, full half an inch deep; which mode is very proper in sowing between other crops, as between wide rows of beans, peas, cabbages, &c. as it admits of hoeing up the weeds between the rows with facility; and if sown thin, and the plants be thinned properly, they grow large and fine, and the produce is very conveniently gathered. It may likewise be sown in wide drills alone, about a foot distance for a distinct full crop: or in rows two feet asunder, to admit of intercropping in the intervals with rows of cabbages, beans, and other things occasionally.

In these sowings the seeds should be scattered moderately thin, and the plants be thinned out to three inches distance at least, being directly raked regularly in: and when sown broad-cast all over the surface, if in light loose land, and a dry warm season in the advanced part of spring, or in the summer and autumn, it may be proper first to tread the seed evenly down, then raking it in effectually with a large rake.

The seeds mostly come up in a fortnight; or perhaps, if sown very early in spring, three weeks or a month.

In respect to the after-culture of the crops, when the plants have three or four leaves an inch broad they should be thinned and cleared from weeds, either by hoe or hand; but the former is the most eligible, especially for the broad-cast-sown crops; choosing dry weather, and cutting out the plants to three or four inches distance, together with all the weeds in every part; but the above distance is scarcely sufficient, unless intended to begin thinning out the plants for use while young: in other cases it is advisable to hoe them out six or eight inches asunder, especially the spring and summer crops of the Round Spinach, which, having proper room, will grow very large, and spread its broad leaves widely, and does not run to seed so soon as if left close. When the spring- and summer-sown crops are left too close, they are apt to draw up weak, and soon go to seed. The winter crops of Triangular or Prickly Spinach, when thinned out finally to three or four inches distance, will be sufficient.

These crops are often sown in spring with other crops, for the sake of cropping the ground to the best advantage; but it is best alone.

When the plants have leaves two or three inches broad, they may be gathered.

The method of which is, either by cutting up

with a knife, wholly to the bottom, or cleaning out by the root if the crop wants thinning; or only cropping the large outer leaves; the root and heart, remaining, shoot out again. With the spring crops, when the plants want thinning, they may be cut up wholly to the root, thinning them out where thickest in a gradual manner, so as to leave the standing plants at least six or eight inches distant to grow to perfection, which, when beginning to shoot for seed, may also be cut up wholly to the bottom: and in the winter-crops, if the plants stand too close at first, some may be thinned out quite to the bottom, afterwards the larger outer leaves must only be cropped in the winter, and early part of the spring; but when the spring is more advanced, and the plants grown large and require thinning, or when they begin to run to seed, cutting them up to the bottom in a thinning order.

Some of the best of the different sorts of plants should be left in the spring to stand for seed, which should be collected when well ripened.

SPIRÆA, a genus containing plants of the shrubby and herbaceous kinds.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved five-cleft perianth, flat at the base, with acute segments; permanent: the corolla has five petals, inserted into the calyx, oblong-rounded: the stamina have more than twenty filaments, filiform, shorter than the corolla, inserted into the calyx: anthers roundish: the pistillum has five or more germs: styles as many, filiform, length of the stamens: stigmas headed: the pericarpium is an oblong capsule, acuminate, compressed, two-valved: the seeds few, acuminate, small, fastened to the internal suture.

The species cultivated are: 1. *S. salicifolia*, Willow-leaved Spiræa; 2. *S. tomentosa*, Scarlet Spiræa; 3. *S. hypericifolia*, Hypericum-leaved Spiræa; 4. *S. argentea*, Silvery-leaved Spiræa; 5. *S. chamaedrifolia*, Germander-leaved Spiræa; 6. *S. crenata*, Hawthorn-leaved Spiræa; 7. *S. triloba*, Three-lobed-leaved Spiræa; 8. *S. opulifolia*, Currant-leaved Spiræa; 9. *S. sorbifolia*, Service-leaved Spiræa; 10. *S. Aruncus*, Goat's-beard Spiræa; 11. *S. filipendula*, Common Dropwort; 12. *S. ulmaria*, Common Meadow Sweet; 13. *S. trifoliata*, Three-leaved Spiræa.

The first has the stalks very taper, and rough towards the top, and covered with a reddish bark: the leaves about three inches long, and an inch broad in the middle, bluntly serrate,



Painted by Jyd Edwards

London Published April 1806. by G. Kearsley Fleet Street.

Engraved by F. Sauter

1 *Spiraea lobata*
Lobe-leaved Meadow Sweet

2 *Sisyrinchium iridioides*
Iris-leaved Sisyrinchium

and of a bright green colour. In rich moist ground the stalks rise five or six feet high, but in moderate land from three to four; as their whole height is one year's growth from the root: they are terminated by spikes of pale red or flesh-coloured flowers. It flowers in June and July; and in moist seasons there are frequently young shoots from the root which flower in autumn. It is a native of Siberia.

There are several varieties: as the Flesh-coloured Willow-leaved, the Alpine Willow-leaved, the Panicked Willow-leaved, and the Broad Willow-leaved *Spiræa*.

The second species has the stalks slender, and branching out near the ground, with a purple bark covered with a gray mealy down: the leaves smaller than those of the first, downy and veined on their under side, but of a bright green above: the branches terminated by a thick raceme of flowers, branched towards the bottom into small spikes: the flowers very small, of a beautiful red colour, appearing in July, August, and September. It is a native of Pennsylvania.

The third rises with several slender shrubby stalks five or six feet high, covered with a dark brown bark, sending out small side branches the whole length: the leaves small, wedge-shaped, having many punctures on their surface: the flowers in small sessile umbels, each on a long slender pedicel, and white: they appear in May and June; and as the flowers are produced almost the whole length of the branches, it makes a good appearance during the time of flowering. It is a native of Italy and America.

The fourth species has striated erect branches, with short branchlets: the leaves alternate, petioled, silky-tomentose on both sides: the racemes longer than the branchlets: the flowers very small, with villose germs. It is a native of New Granada.

The fifth has abundant shoots, seldom two ells high, the thickness of the finger, wand-like, branched: the wood brittle: the bark of the shoots yellowish-brown, with prominent dots scattered over it: the branches alternate, commonly angular, with a testaceous bark somewhat striated, and in the younger branches covered with a tender ash-coloured epidermis, which falls off; the annual shoots are grooved and pubescent: the leaves alternate, softish, pubescent with prostrate hairs, quite entire at the base, but commonly gash-serrate from the middle to the end, where they are sharp: corymbs at the top of the stems frequent, many-flowered, terminating the annual alternate shoots: in gardens and in moist shady places these corymbs are more elongated; but in a ruder soil most of the peduncles are clustered at the top

like an umbel: the flowers biggish, white, having a weak virose smell, and fugacious. It is a native of Siberia, &c.

It varies very much, with larger or smaller leaves, more or less cut, but more commonly quite entire and ovate-acute.

The sixth species has several stems, scarcely two ells high, very much branched from the bottom: the branches rod-like, round, with a testaceous bark cloven longitudinally: the leaves on the younger branches and annual shoots alternate, attended with smaller ones in little bundles, hoary or glaucous, three-nerved, hardish, varying in form and size; on the luxuriant shoots or branches sometimes ovate-acute, widish, serrulate from the tip beyond the middle; but commonly oblong, bluntish, crenulate, or serrulate towards the tip, or more commonly quite entire: the corymbs at the ends of the annual twigs, very abundant, disposed along the branches on one side, in hemispherical clusters: the flowers smallish, white, odorous. It is a native of Spain, &c., flowering here in April and May.

The seventh has numerous stems, scarcely thicker than a swan's quill, very much branched, upright, with a gray bark more or less pale, and somewhat angular, with sharp streaks running down from the branches: the branches and branchlets alternate, those of the last year very smooth and yellow, leafy, and terminated by an umbel: the leaves alternate, on very short petioles, smooth, glaucous, wide-ovate, retuse, gash-trilobate: they vary even in the garden, with fewer or more frequent gashes, with the teeth or lobes obtuse or acute, in breadth, &c.: the umbels very frequent at the ends of the annual branches: peduncles often more than thirty, besides a few axillary ones scattered below the umbel: the flowers middle-sized, white. It is an elegant shrub, and a native of Siberia.

The eighth species rises with many shrubby branching stalks, eight or ten feet high in good ground, but generally five or six; they are covered with a loose brown bark which falls off: the leaves about the size and shape of those of the common currant bush, ending in acute points, and serrate on their edges: the flowers are produced in roundish bunches at the end of the branches; are white with some spots of a pale red. It is a native of Canada and Virginia. It is commonly known in the nurseries by the name of Virginian Gelder Rose.

The ninth rises with shrubby stalks like the first, but sends out horizontal branches, which are slender, and covered with a brown bark: the leaves are of a thin texture, and a bright green colour on both sides, slightly and acutely serrate: the flowers in terminating panicles, small

and white. It is a native of Siberia, flowering in August.

The tenth species has a perennial root: the stem annual, from three to four feet high: the leaves doubly pinnate; each having three or four pairs of oblong leaflets terminated by an odd one: they are two inches long, and almost an inch broad, serrate, and ending in acute points: the flowers disposed in long slender spikes, formed into loose terminating panicles; they are small, white, and of two sexes in the same spike. It is a native of Germany, flowering in June and July.

The eleventh has a perennial root, consisting of oval tubers or solid lumps, hanging from the main body by threads, which has given occasion to its common names, *Filipendula* and *Dropwort*. These tubers enable the herb to resist drought, and render it very difficult to be eradicated: the stem is erect, from a foot to a foot and half in height, angular, smooth, leafy, a little branched at top: the leaves alternate, interruptedly pinnate, serrate, and jagged, smooth, composed of several pairs of leaflets, all of each set uniform or nearly corresponding in size; the terminating leaflet three-lobed: a pair of roundish united indented stipules at the base of each leaf, embracing the stem: the flowers many in a cymose loose erect panicle, cream-coloured often tipped with red, or red on the outside. It is an elegant plant, which in gardens grows very luxuriant, and has often double flowers. It flowers early in July.

The twelfth has a perennial fibrous root: the stems erect, three or four feet high, angular and furrowed, tinged with red, leafy, branched in the upper part: the leaves interruptedly pinnate: leaflets very unequal in size, sharply serrate, clothed beneath with white down, the end one remarkably large and three-lobed: a pair of rounded serrate stipules are joined to the common leaf-stalk, and clasp the stem: the flowers white, in a large very compound cyme, the side-branches of which rise much above the central one: it perfumes the air with the sweet hawthorn-like scent of its plentiful blossoms from June to August.

There are varieties with double flowers, and with variegated leaves.

The thirteenth has a perennial root: the stalks annual, about a foot high, sending out branches from the side the whole length: the leaves for the most part trifoliate, but sometimes single or in pairs; they are about an inch and half long, and half an inch broad, ending in acute points, sharply serrate, of a bright green above, and pale beneath: the flowers in loose terminating panicles, on slender peduncles. It

is a native of North America, flowering in June and July.

Culture.—In all the shrubby sorts, this may be performed by suckers, layers, and cuttings.

The suckers should be taken off in the autumn and planted out where they are to remain, or in nursery-rows, to attain a fuller growth.

The first sort requires to be cleared of these suckers every two years at furthest.

The layers should be put down in the autumn or in the spring, and may be taken off and planted as above, in the autumn or spring following: all the sorts may be raised in this way; but it is most proper for such sorts as do not send off suckers.

The cuttings may be made from the shoots of the preceding summer, and be planted out in a shade border in the early autumn: when they have become well rooted they may be removed and managed as the others: they succeed in this way with more difficulty than in either of the others.

All the herbaceous sorts may be increased by seeds, or parting the roots.

The seed may be sown in the autumn or early in the spring; but the first is the better mode, on a bed of fine mould: when the plants appear they should be kept clear from weeds till the autumn, when they may be planted out where they are to remain, or in the nursery for a year or two.

The roots should be parted in the autumn or spring, when the stems decay, before they shoot out new ones, being planted immediately where they are to grow.

The double-flowered and stiped varieties can only be preserved in this way.

They all afford variety and ornament in the shrubbery and other parts.

SPONDIAS, a genus containing plants of the exotic tree kind.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Terebinthaceæ*.

The characters are: that the calyx is a one-leaved perianth, subcampanulate, small, five-cleft, coloured, deciduous: the corolla has five oblong petals, flat, spreading: the stamina have ten awl-shaped filaments, erect, shorter than the corolla, alternately longer: anthers oblong: the pistillum is an ovate germ: styles five, short, distant, erect: stigmas obtuse: the pericarpium is an oblong drupe, large, marked with five dots from the falling of the styles; ten-valved: the seed is an ovate nut, woody, fibrous, five-cornered; five-celled; covered with a fleshy elastic aril.

The species is *S. Mombin*, Purple Hog-Plum, or Spanish Plum.

Its usual height in its native situation is ten or twelve feet, and the stem is as large as a man's leg, sending out branches towards the top covered with a gray bark; these are destitute of leaves for some months; and in the spring, before the leaves appear, many purple flowers come out from the side of the branches; these are succeeded by fruit like plums, having a luscious thin pulp, covering a large fibrous stone: the leaves which come out afterwards are unequally pinnate, with four or five pairs of leaflets, about an inch long and half an inch broad. It is a native of South America.

It is cultivated in its native state by many for the sake of the fruit, which is pretty pleasant.

There is a variety of this fruit called The Leathercoat, from the appearance of its skin.

Culture.—It is increased by sowing the stones of the fruit in pots filled with light mould, plunging them in the bark-bed of the stove; and by planting, cutting, or putting down layers, and managing them in the same way: the plants may be taken off and removed into separate pots when they have stricken good roots, being replanted in the bark-bed.

They require afterwards to be kept constantly in the stove, and to have the same management as other woody exotics of the same nature.

They afford variety in stove collections.

SPONGE-TREE. See MIMOSA.

SPRUCE FIR. See PINUS.

SPURGE. See EUPHORBIA.

SPURGE LAUREL. See DAPHNE.

SPURGE OLIVE. See DAPHNE MEZEREUM.

SQUASH-GOURD. See CUCURBITA.

SQUILL. See SCILLA.

SQUIRTING CUCUMBER. See MOMORDICA.

SPROUTS, the small young shoots or suckers emitted from the sides of the stems and heads, of vegetables, being in many instances a sort of compendium of the plant that produced them; and, when detached and planted, although destitute of roots, often emit fibres, shoot at top to mature growth, and exhibit leaves, flowers, and seed, as the parent plant.

In some herbaceous esculent plants, the young sprouts are excellent eating; as in the cabbage kinds, &c. affording a very profitable after-crop: the sprouts produced from the forward cabbage-stalks in summer and autumn are always larger and finer than the winter and spring sprouts; and sometimes the sprouts produced on the stalks of the early-cut cabbages often also cabbage into tolerable little firm heads towards autumn; in the Sugar-loaf Cabbage particularly, and other

forward kinds; producing abundance of fine sprouts in summer, which, being gathered while young and green, constitute some of the most excellent culinary greens of the season; likewise forward Savoys being cut early in autumn, the remaining stalks produce fine large sprouts the same year, fit for use in the early part of winter; later crops of the same plants produce also abundance of small sprouts in the spring; and the Borecole is remarkable for its great production of sprouts towards spring, emitted all along the small stems from the very bottom to top; also Purple Brocoli never fails to produce a secondary crop of excellent sprouts furnished with little tender heads.

In the culture of all the varieties of the cabbage kind, it is proper, therefore, after gathering the main-heads, to leave a quantity of the stalks of the best and more forward crops, of the respective sorts, to produce sprouts; and if, towards autumn or winter, &c., the ground should be wanted for other crops, the stalks may be removed and trenched in by the roots in another place, not in any shady by corner, as often practised, nor placed too close, as the sprouts would prove small and trifling, and be liable to be eaten up by slugs; but in an open situation, in rows a foot asunder, in which method the sprouts will continue their growth in much greater perfection, though probably not in so good as if the stalks had remained undisturbed.

As the stalks of Cauliflowers and Cauliflower-brocoli rarely produce any sprouts, it is needless to leave them standing on the ground.

STANDARD TREES, such as stand singly with an upright stem without being trained to any wall or other support. The term is applicable to all sorts of fruit- and forest-trees, as well as other tree and shrub kinds that have upright stems, and which stand detached erectly without support; though it is more generally understood of such trees as grow with tall erect stems, six or eight feet high or more, before they branch out to form the head; such as the common apple-, pear-, and other fruit-trees in orchards and gardens, and the common forest-trees of the woods and fields. In gardening, they are distinguished into three sorts; as Full Standards, Half Standards, and Dwarf Standards; from their being occasionally trained in all these ways: but forest and tall-ornamental trees rarely in any other than Full Standards; though, in the shrub tribe, they are occasionally formed both into Half and Dwarf Standards, according to their natural growths.

Full Standards.—These are such trees as are trained with tall, straight, clean stems, six or seven feet high or more, then suffered to branch

out at that height all around to form a head, as in common standard apple- and pear-trees, forest-trees, &c.

Such trees as are designed for full-standards, should be trained accordingly in their minor growth, by trimming off all lower lateral branches gradually as the stem advances in height, to encourage a clean straight growth to the proper height, and promote the aspiring of the top or leading shoot more expeditiously; suffering the leader always to remain entire, especially in all forest-trees; or, if it should happen to fork, taking off the worst, and leaving the straightest shoot to run up, to continue the prolongation of the stem; and having thus run them up with clean stems gradually from six or seven to eight or ten feet or more, especially the deciduous kinds, suffer them to branch out into a full head, and run in height as fast as possible; though in fruit-trees the stem is often topped at six or seven feet height, to force out a set of laterals in that part, to form a regular spreading head of but moderate height, for the greater convenience of gathering the fruit; but for all kinds of forest-tree standards the tops should never be reduced, but the leader be permitted to remain entire to run up in height; as the beauty and worth of such trees consist in their lofty growth.

But in several forest and ornamental standards of the evergreen tribe, the trimming their stems from laterals while young, in this way, must be but sparingly practised; such as the pines, firs, cedars, and several others, which, being of a resinous nature, do not succeed if too closely pruned; besides, when designed for ornamental plantations, the trimming up the under branches would greatly diminish the beauty of their peculiar growth; for the disposition of the branches in most of them, covering the stem in circular rays to the very bottom, is thought additionally ornamental. The lower disorderly stragglers should of course only be taken off.

Most sorts of fruit-trees may be trained for full standards, except vines; though some of them will not ripen their fruit effectually in this way, as peaches, nectarines, apricots, and figs; but, on the other hand, all sorts of apples, pears, plums, and cherries, ripen their fruit freely on standards.

All fruit-trees for this purpose are raised by grafting, &c. on the freest strong-shooting stocks, and trained with straight clean stems, as above, either the stock trained up to that height, and then grafted or budded, the graft or bud branching out forming the head, or the stock grafted, near the ground, and the first shoot from the graft or bud trained up for a stem to the proper height, then suffered to send

forth branches; in either method, it is next to be considered whether it be intended the tree shall form a spreading open head, or assume a more erect and aspiring growth; in the former case, if the leading shoot of the graft or bud be topped at six or seven feet from the ground, it will force out lateral shoots at that height, and commence a spreading head open in the middle, suffering, however, the whole afterwards to take their own growth; and in the latter by permitting the leading shoot to remain entire, it will aspire in height, and the whole head will assume a more upright and lofty growth; in both methods the heads will afterwards naturally branch out abundantly, and furnish themselves sufficiently with bearing wood, producing fruit, in some sorts, in two or three years from the grafting and budding, as in cherries, apples, &c. but pears are sometimes four, five, or six years before they bear.

It is expedient to train most of the principal hardy fruit-trees as full standards, that, when planted in continued rows, either in gardens or orchards, by having tall stems, they may admit the influence of the sun and air more freely to the heads, and permit the obtaining crops of esculents, grass, &c. from the ground under them.

In respect to the management of full standard fruit-trees, little is required after the first training, to form the stem to the proper height, and the first shoots are advanced at top to give the head its first formation, being allowed to advance nearly in their natural order, except reducing any very irregular growths, permitting the whole to shoot both in length and branch laterally in their own way; by which they naturally form fruit-spurs along their sides upwards for bearing.

The irregular branches must, however, be removed, and the heads kept properly thinned, as well as the suckers rubbed off from the stems or other parts. See PRUNING.

Standard fruit-trees with high stems are sometimes planted against walls, and trained as wall-trees; this is practised for high walls, so as immediately to cover the upper parts of them, whilst Dwarfs and Half Standards cover the bottom and middle parts, and thus every part of the wall is fully occupied at once: but in these cases the dwarf-trees are to remain, the others being wholly destroyed after a time. See WALL-TREES.

These sorts of high standards are likewise occasionally placed against the ends of buildings; some choice sorts of pears in particular: also apricots in a southerly aspect, and other fruit-trees of the same kind.

Half Standards.—These are trees trained with stems only three or four feet high, then suffered

to branch out to form heads. It is practised for many sorts of fruit-trees, both as detached standards for variety, and with fanned spreading heads, as wall-trees for high walls.

The method of raising these is nearly the same as for the full standards; only they are grafted or budded upon lower stocks, training them with upright single stems only three or four feet high, by the stocks on which they are grafted being trained up to that height for a stem; or by being grafted or budded low in the stock, and the first main shoot of the graft, &c. led up for a stem, and topped at that height to force out branches to form the head; suffering the heads in those designed as detached standards, to branch out all around, and run up to a full spread, nearly according to their natural mode of growth, except just reforming any ill-growing branch, as shortening the branches should be sparingly practised, as it would force out numerous useless shoots, and prevent the formation of bearing wood, especially in the apple, pear, plum, and cherry kinds.

When Half Standards are intended for walls, they should have the head trained in a somewhat fanned manner, to spread to the wall like a common wall-tree.

When it is necessary to have them to form heads of as moderate growth as possible, especially in the detached half standards for small compartments, they should be grafted or budded upon the more dwarfish sort of stocks, as apples upon codlins, and pears upon quinces, &c.; in which case the heads will always shoot moderate, and never ramble wide or grow high. See STOCKS.

But though a few of this sort of trees may be eligible as detached half standards for variety, they are not proper for the open quarters of the garden; as their branches coming out low may impede the growth of under-crops.

For walls, however, that are eight or nine feet high, they are proper to plant between the dwarfs or principal residents, to cover the middle or upper half of the wall, whilst the dwarfs occupy the lower space. See WALL-TREES.

Half Standard cherries, apricots, &c. are also proper to plant in forcing-frames to produce early fruit. See FORCING-FRAMES.

The after-management of detached trees of this sort, in respect to pruning, is nearly the same as the full standards, as, after having shot out at top to form the head, they should be permitted to branch both in length and laterally nearly in their own way, except just pruning to order any considerable irregularity, crowding branches in the middle or long ramblers, and detaching all suckers from the root, stem, and

VOL. II.

head, and to cut out casual dead wood; and thus the regular branches remaining at length, will emit fruit-spurs abundantly in every part for bearing.

The Half Standards against walls are to be pruned and managed as other wall-trees, each according to its nature.

Dwarf Standards.—These are trained with low stems only one or two feet high, and then topped to force out branches to form the head.

Several sorts of choice fruit-trees are trained as dwarf standards, with stems not more than one foot high, branching out at that height, forming proportionably low heads; being occasionally planted round the borders of the kitchen- or pleasure-garden, &c., instead of espaliers, and the heads either kept down low by close pruning, or suffered to branch upward nearly in their natural growth. These are raised by grafting, &c. upon the most dwarfish stocks, such as apples on codlin- or paradise-stocks, and pears on quinces, &c. in order to dwarf them as much as possible in their growth; and as they shoot in height, each year's shoots either pruned short, to keep the head down and confine it within a small compass; or the branches permitted to shoot in length, except just reducing casual ramblers and disorderly growers. These kinds of dwarf standards are not so generally introduced now, as espalier fruit-trees have been brought to a proper degree of perfection in training and bearing.

Some have Dwarf Standard fruit-trees in pots, for the purpose of forcing in hot-houses, forcing-frames, hot-beds, &c. particularly early May and May-duke cherries, plums, peaches, nectarines, apricots, figs, vines, gooseberries, currants, &c. which being placed as above, in January or early in February, often ripen a few fruit very early in tolerable perfection, some of which might be brought to table growing on the trees in the pots. Dwarf Standard fruit-trees are also proper to plant fully in the borders in forcing-frames. See FORCING-FRAME, and DWARF-TREES.

The different varieties of currants and gooseberries may be trained with a single stem a foot or more high, and then permitted to branch out into a regular head, keeping the internal part always tolerably open, and the branches moderately thin; and shortening them but sparingly, particularly the gooseberry, by which dwarf shrubby plants are formed.

STAFF-TREE. See CELASTRUS.

STAG'S-HORN-TREE. See RHUS.

STAPELIA, a genus containing plants of the succulent perennial kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a one-leaved perianth, five-cleft, acute, small, permanent: the corolla one-petalled, large, flat, thick, five-cleft beyond the middle: segments wide, flat, acuminate: nectary, five leaflets, spreading, linear, grooved, emarginate with a dagger point, opposite to the segments of the corolla: leaflets five others, fastened alternately with these a little higher to the tube of the filaments, and running along it, vertical, bifid: interior segment erect, with the summit bent outwards; outer segment straight, compressed: the stamina have five filaments, united into a short tube; each anther fastened internally to the base of each vertical leaflet of the nectary, and wider than it, incumbent on the stigma, short, two-lobed, two-celled, produced below on both sides into an earlet, contiguous at the margin to each of the neighbouring anthers as far as the tip, and ascending at the tip: pollen united into ten corpuscles, crescent-shaped, flattish, ascending obliquely into the cells of the anther, each on a very short pedicel, (with a transverse base, incumbent on the upper margin of the earlet,) fastened by pairs to five small twin coloured tubercles, placed on the apex of the earlets, and adhering to the angles of the stigma: the pistillum has two ovate germs, flat inwards: styles none: stigma common to both germs, large, placed on the tube of stamens, acutely five-cornered, flat above, obliquely truncate-excavated at the sides for the reception of the anthers: the pericarpium two follicles, long, awl-shaped, one-celled, one-valved; the seeds numerous, imbricate, compressed, crowned with a down: the receptacle free.

The species cultivated are: 1. *S. hirsuta*, Hairy Stapelia: 2. *S. variegata*, Variegated Stapelia.

The first has the root composed of many strong fibres, from which arise several stalks, which send out other branches of the same shape from their side, having indentures at each angle their whole length, the points of which are erect: the stalks or branches deep green, but the angles and points of the indentures inclining to brown, especially if the plants be exposed to the open air in summer. The flowers come out from the side of the stalks upon long fleshy peduncles: the petal is of a thick leathery substance; the inside variegated and hairy, and the borders of the segments closely furnished with long brown hairs: in the centre is the double starry nectarium, the points of which

are lacerated, and it is of a purple colour. It is a native of the Cape, flowering in June and July.

The second species has many branches the size of a man's finger, four or five inches long, having several protuberant indentures on their sides which spread open horizontally, and ending in acute points; these branches spread on the ground and emit roots from their joints; they are angular, and of a deep green colour in summer, but in winter change to purplish; they abound with a viscous juice of a nauseous taste: from the side of the branches towards the bottom comes out the peduncle, at one of the sinuses; it is short, and sustains one flower of a yellow colour spotted with purple; it is a native of Africa, flowering in June and July. There are others that may be cultivated.

Culture.—These sorts are readily increased by cuttings or slips of the young branches, which should be exposed a few days in a dry covered place to heal over the cut part, and be then planted in pots filled with light poor dry fresh sandy earth with lime rubbish, plunging them in the tan-bed of the stove, where they soon strike root; when they are well rooted they may be removed into separate pots, replunging them in the bed till fresh rooted, when they may be placed on the tops of the flues, or on shelves in the hot-house; they are also capable of being preserved in the green-house; they have a fine effect in their leafless watery appearance and the beauty of their flowers.

STAPHYLEA, a genus containing plants of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Trihilatæ*.

The characters are: that the calyx is a five-parted perianth, concave, roundish, coloured, almost as big as the corolla: the corolla has five oblong petals, erect, like the calyx: nectary from the receptacle of the fructification, in the bottom of the flower, concave, pitcher-shaped: the stamina have five oblong filaments, erect, length of the calyx: anthers simple: the pistillum is a thickish germ, three-parted: styles three, simple, much longer than the stamens: stigmas obtuse, contiguous: the pericarpium has three capsules, inflated, flaccid, united longitudinally by a suture, opening inwards by the acuminate apex: the seeds two, bony, globular, with an oblique point and an orbicular excavation by the side of the apex.

The species are: 1. *S. pinnata*, Five-leaved Bladder-nut: 2. *S. trifolia*, Three-leaved Bladder-nut.

The first has several shrubby stalks arising

from the same root, and growing ten or twelve feet high, covered with a smooth bark, and dividing into several branches, which are soft and pithy: the leaves are composed of two pairs of ovate leaflets terminated by an odd one; these differ greatly in size, according to the strength and vigour of the shrub; some being more than two inches long, and an inch and half broad; but on old weak shrubs they are much smaller, are smooth, entire, and of a light-green colour, standing upon pretty long footstalks: the flowers come out upon long slender pendulous peduncles, from the axils of the stalks near their extremity, in oblong bunches: the petals are white, and expand in form of a rose: the flowers appear in May. It is a native of the South of Europe.

The second species has a more substantial stem than the first, the bark of the old branches and stalks is smooth and of a gray colour; that of the young ones of a light green and very smooth: the leaflets are ovate, ending in a point, and serrate on the edges; the largest three inches long and two broad; but in old plants they are not much more than half the size: the flowers are produced from the side of the branches in longer bunches than those of the former sort, but their peduncles are much shorter; the flowers are of a clearer white, and their petals are somewhat larger; as are also the bladder capsules. It is a native of North America.

Culture.—These plants may be increased by seeds, suckers, layers, and cuttings. The seeds should be sown as soon as they become ripe, in the autumn, in a bed of common earth, to the depth of an inch; they should be kept clear from weeds, and refreshed in dry weather with water frequently: in the following autumn or spring the large plants should be removed into nursery-rows, at two feet apart and one foot distant in the rows, to remain till of sufficient growth for the shrubbery; the suckers may be taken up in autumn or early in the spring, with root fibres to them, and planted in nursery lines in the above manner: the layers may be put down from the young branches being either slit or twisted, and when properly rooted in the following autumn be planted out in the nursery as above: the cuttings should be made from the lower parts of the young shoots of the preceding year, planting them in a shady border in the autumn, and watering them frequently during the spring and summer when the weather is dry; and when well rooted, in the autumn following, planting them out in nursery-rows as above, or where they are to remain: they afford ornament and variety in the shrubbery parts of pleasure-grounds.

STAR APPLE. See *CHRYSOPTILLUM*.

STAR FLOWER. See *ORNITHOGALUM*.

STAR HYACINTH. See *SCILLA*.

STAR OF BETHLEHEM. See *ORNITHOGALUM*.

STAR THISTLE. See *CENTAUREA*.

STATICE, a genus comprehending plants of the hardy, herbaceous and under-shrubby kinds.

It belongs to the class and order *Pentandria Pentagynia*, and ranks in the natural order of *Aggregata*.

The characters are: that the calyx is a common perianth, of a different structure in the several species: the perianth proper one-leafed, funnel-form: tube narrowed: border entire, plaited, scariose: the corolla funnel-form: petals five, united at the base, narrowed below, above wider, obtuse, spreading: the stamina have five awl-shaped filaments, shorter than the corolla, inserted into the corolla by their claws: anthers incumbent: the pistillum is a very minute germ: styles five, filiform, distant: stigmas acute: the pericarpium is an oblong capsule, somewhat cylindrical, membranaceous, five-cusped, one-celled, valveless: proper calyx contracted at the neck, expanded in the border, cherishing the capsule when the corolla withers: seed single, oblong, hanging from a long cord.

The species cultivated are: 1. *S. Armeria*, Thrift, or Sea Gilliflower: 2. *S. Limonium*, Sea Thrift, or Sea Lavender: 3. *S. cordata*, Heart-leaved Sea Lavender: 4. *S. reticulata*, Matted Sea Lavender: 5. *S. echinoides*, Rough-leaved Sea Lavender: 6. *S. speciosa*, Plantain-leaved Sea Lavender: 7. *S. tatarica*, Tartarian Sea Lavender: 8. *S. pectinata*, Triangular-stalked Sea Lavender: 9. *S. suffruticosa*, Narrow-leaved Shrubby Sea Lavender: 10. *S. monopetala*, Broad-leaved Shrubby Sea Lavender: 11. *S. ferulacea*, Cut-leaved Sea Lavender: 12. *S. sinuata*, Scallop-leaved Sea Lavender.

The first has a perennial woody root, bearing many thick tufts of lax, linear, channelled, smooth, entire leaves: the scape erect, simple, pubescent, varying much in height (from two to eight inches or even a foot), terminated by a globular head of many flowers, encompassed by a many-leaved involucre, the base of which is attached to a singular cylindrical membranous sheath, about an inch long, and investing the top of the scape, its lower end being loose and lacerated, so that it seems to have been torn off from the root, and carried up with the young growing stem: the calyx small, erect: the corolla rose-coloured or pink (varying to deep red, scarlet and white). It is a native of Europe and North America: it flowers from June to August.

There are several varieties: as with red flowers, with scarlet flowers, with white flowers. Great Thrift with red flowers, with white flowers; and Small Sea Pink, with flesh-coloured flowers.

The second species has scarcely any resemblance to lavender, and none of its aromatic quality; has a strong, perennial, woody root: it varies much as to luxuriance, being sometimes found with leaves scarcely an inch long, and not more than six or eight flowers in a panicle, and at other times much larger, with the flowers far more abundant, of a bright blue colour, which distinguish it at a distance: it is a beautiful plant. It is a native of Britain, flowering in July.

There are several varieties: as Common Great Sea Lavender; Great Late-flowering Sea Lavender; Olive-leaved Sea Lavender; Deep Blue-flowered Sea Lavender; and White-flowered Sea Lavender.

The third has the stalks naked, about six inches high: leaves wedge-shaped, emarginate at the end, and sometimes quite entire, rigid, running down into the petiole; varying in size, according to the soil: the flowers numerous, blue, imbricate, one-ranked, sometimes pale red, appearing in August, but never produce seeds in this climate. It grows naturally near the sea, about Marseilles, Leghorn, &c.

The fourth species has a strong root, woody and perennial, bearing thick tufts of small narrow obovate spatulate or wedge-shaped leaves, slightly pointed but not awned, and entire: the scapes prostrate, very much branched: the branches flexuose, matted and entangled with each other, having an ovate sharp membranous bracte at each divarication: many of the branches are barren, and those often reflexed, but not always: the flowers few together in simple terminating spikes or bundles, erect, each enveloped in three or four larger blunt bractes: the ribs of the calyx, and the petals, are of a bright purplish blue, which turns white in drying. It is a native of the South of France and Malta.

The fifth is an annual plant, (biennial) with long narrow leaves, which are set with rough tubercles; the stalks about eight inches high, dividing into two or three small branches, which are terminated by short reflexed spikes of pale blue flowers, coming out late in August, and seldom perfecting seeds in this climate: it is a native of the South of Europe and Barbary.

The sixth species has many radical leaves, oblong, smooth, curled, ending in a sharp point: the stems a foot high, branched, round, firmer than in the other species, sometimes winged, three or four spreading round the bottom, where there is abundance of very elegant flowers which

are larger than those of the second sort and white, forming a handsome silvery head.—It is a native of Russia, flowering in July and August.

The seventh has the leaves about four inches long, and three quarters of an inch broad in the middle, diminishing gradually to both ends: the stalks rise about five or six inches high, dividing into several spreading branches, which are again divided into smaller; these are terminated by spikes of pale-blue flowers ranged on one side the footstalk: the whole, when growing, being spread wide, has somewhat the appearance of an umbel of flowers, which come out in August, but never ripen seeds in this climate. It is a native of Russia, flowering in June.

The eighth species is a native of the Canary Islands, flowering in September and October.

The ninth is a native of Siberia, flowering most part of the summer.

The tenth species has a shrubby stalk about two feet high, dividing into several woody branches, which spread out on every side; the lower parts of these are closely furnished with gray leaves of a thick consistence: the branches are terminated by panicles of blue flowers, coming out singly at a distance from each other, having one funnel-shaped petal, with a long tube, and dividing into five spreading segments at top: it flowers from June till autumn, but never produces seeds in this climate. It is a native of Sicily.

The eleventh has round stems, somewhat woody, naked with alternate chaffs, panicled: the branchlets very much subdivided, in bundles, filiform, imbricate with very minute chaffs, terminated by a little bristle: the flowers subimbricate, ascending, directed one way, yellow. It is a native of Spain, of Portugal, and of Barbary.

The twelfth is a biennial plant: the lower leaves, which spread on the ground, are indented almost to the midrib; these indentures are alternate and blunt: the stalks rise a foot and half high, dividing upwards into several branches, having at each joint three narrow leaves sitting close to the stalks, from the base of which proceeds a leafy membrane or wing which runs along on both sides the stalk; these are rough and a little hairy: the stalks are terminated by panicles of flowers, which sit upon winged peduncles, each sustaining three or four flowers of a light blue colour, which continue long without fading: it flowers in July and August; but unless the summer is warm and dry, the seeds do not ripen in this climate. It is a native of Sicily and the Levant. There are two

varieties, which differ in their leaves, stems, and flowers.

Culture.—All the sorts are capable of being increased, by parting or slipping the roots: this, with the first kind, should be performed in the autumn or very early spring season, planting them immediately as edgings, or in the borders; they should not however be parted too small.

When planted out as edgings, a quantity of slips should be obtained in these seasons from old plants, by slipping or dividing the off-sets of their roots, each slip being furnished with roots and tops; then, having made up the edge of the bed or border even and firm, planting them either with a dibble in one range, two or three inches distance in the row; or to form at once a close edging, so near as to touch one another, or in a small trench, close, as in planting box edgings: these edgings should every summer, immediately after flowering, be trimmed with garden-shears, or a knife, to cut off all the decayed flower-stalks close to the bottom; likewise to trim in any projecting irregularity of the edging at the sides or top: also when it spreads considerably out of bounds, should be cut in evenly on each side, in due proportion; performing those trimmings in moist weather, and not too late in autumn, otherwise the drought of summer, or the cold in winter, will be apt to injure them when newly cut, and cause them to have a shabby disagreeable appearance: but when these edgings grow considerably out of bounds, or become very irregular, it is necessary to take them up, slip the plants small, and immediately replant them again as before, in a neat regular edging: they sometimes require replanting every three or four years in this manner.

The second sorts may likewise be raised by parting the roots in the autumn or spring, preserving some mould to them, and planting them out again immediately, being placed in an east border, where the soil is loamy.

They may also be raised from seeds obtained from abroad, sowing them on a similar border, keeping the plants clean, and when of sufficient growth planting them out in pots: it is the common practice in treating the second sort, according to Martyn, to consider it as a green-house plant; and it appears to the greatest advantage in a pot, as it is much disposed to throw up new flowering-stems: by having several pots, some plants will be in flower throughout the summer; on this account, and for the singularity of its large blue calyx, it is a plant that merits attention. The *Echioides* is also a green-house plant.

The eighth, ninth, tenth sorts, &c., may be increased by planting cuttings of the young

shoots, in July, in a shady border, watering them frequently: when the plants have a little growth, they should be taken up and placed in separate pots, filled with light loamy mould, putting them in the shade till rerooted: the plants of these sorts must be removed into shelter in the autumn, but they only require protection from hard frost, of course may be placed with myrtles, and other hardy green-house plants, where they often continue to flower a great part of winter, and make a pretty variety; these sorts afford variety among other potted more hardy green-house plants.

STAVE'S ACRE. See *DELPHINIUM*.

STOCKS, such young trees as are raised from seed, suckers, layers, and cuttings, and designed for the reception of grafts and buds of other trees, to continue them the same and become trees in every respect like the parent trees from which they were taken.

Stocks for general use are proper when from the size of a good large goose-quill to half an inch, or not more than an inch thick, in the part where the graft, &c., is to be inserted; but they are sometimes used when two or three inches in diameter: these are made use of in most kinds of fruit-trees, and occasionally for some varieties of forest and ornamental trees, and many of the shrub kind: they should in general be species or varieties of the same genus as the trees with which they are to be engrafted.

They are usually divided into three kinds; as *Crab Stocks*, *Free Stocks*, and *Dwarf Stocks*, each comprehending various sorts, both of the same and different genera, species, and varieties.

Crab Stocks.—These are all such as are raised from seeds, &c., of any natural or ungrafted trees, particularly of the fruit-tree kind; such as the crab-apple of the woods and hedges, any kind of wild thorny uncultivated pears, plums, wild black and red cherry, &c., and also of such trees as have been grafted or budded: some sorts, being strong shooters and hardy, are preferred, on which to graft particular species, to improve the size and duration of the trees; for example, apples are very commonly worked upon the common wild crab stock, and cherries on the great wild black and red cherry stock, as tending to promote a large, hardy, and durable growth, proper for common standards and the larger kinds of dwarf trees. In using crab stocks to graft any sorts of fruit-trees, it is proper to reject such of them as assume a very wild crab-like growth, or of a stumpy, thorny nature, preferring those that are the freest clean growers: sometimes, however, the appellation of crab stocks is given to all stocks indiscriminately,

before being grafted; whether raised from the seed, &c., of wild or cultivated trees, until worked with grafts or buds; but with the distinction of wild crabs, and free crabs.

Free Stocks.—This is commonly applied to such as are raised from the kernels of the fruit, layers, &c. of any of the cultivated garden and orchard fruit-trees and others, which often prove more free clean shooters than the wild crabs, and are more proper than they for choice apples, pears, peaches, nectarines, apricots, and plums, to improve the growth of the trees and quality of the fruit.

Dwarf Stocks.—These are such as are raised from low growing trees, of a shrub-like nature, or but very moderate tree-growth, being used for the lower and middling sorts of standards, and to form dwarfs, either for walls or espaliers, or as dwarf standards in small gardens, and others occasionally for variety, as well as for planting in forcing-frames, or to pot for forcing, or curiosity, &c., as the paradise apple and codlin stock, for dwarfing apples; the quince stock, for pears; the bird cherry, morello, and small May cherry stock, for cherries; the bullace and muscle stock for dwarfing apricots, peaches, and nectarines, and sometimes dwarf-almond stocks for the two latter, when designed to have these trees of a very dwarfish growth, either to pot for curiosity, or for forcing in small forcing-frames.

The most dwarfish kinds are: the paradise stock, bird-cherry, black bullace, and dwarf almond; but they are not so proper in general culture as common dwarf-trees, as they never attain a large growth, sufficient to produce any considerable quantity of fruit: the codlin dwarf stocks, quince stock, morello cherry, and muscle-plum stocks, are proper for the middling or larger kinds of dwarf trees, either for walls or espaliers, or dwarf and half standards: they are all raised from suckers, layers, or cuttings.

Sorts of Stocks adapted to each Kind.—For apples, in all the kinds, they are those of their own sort, raised from the kernels of any of the cultivated apples or crab for common standards, and the larger kinds of dwarfs; but the wild crab stock is often esteemed preferable to the free stock, for its hardy and durable nature, on which to graft common standards, and sometimes dwarfs for espaliers; and for lower dwarfs, the codlin, Siberian crab, and paradise stock are sometimes used; the former for middling dwarfs, and the latter for the smallest dwarfs: they are all easily raised, the free stock and crabs from the kernels of the fruit; and the codlin and paradise stock, likewise from suckers, layers, and cuttings. See *PYRUS MALUS*.

For the pear, it is chiefly grafted and budded on pear stocks for general use, but on quince for dwarfs; the former chiefly raised from the kernels of any sort of pears; and the latter freely by suckers, layers, and cuttings; but the pear stock is always to be preferred for the general supply of larger trees, for all common standards, and the larger dwarf pear trees for extensive walls and espaliers: the quince stock is estimable principally for its dwarfing property, or in being productive of moderate shooting trees for walls, espaliers, or middling standards, sooner arriving to a bearing growth. In order to form dwarf pears, white-thorn stocks, raised from seed, were formerly sometimes in repute, but they are very improper, as the trees rarely prosper well; as the goodness of the pear is often improved or diminished by the nature of the stock on which it is grafted, it is of importance to use free stocks, raised from the kernels of the best summer and autumn pears as much as possible; and the prime pears should be worked always on the finest free-shooting stocks of the most cultivated-like growths: sometimes, to improve the quality of particular choice kinds of pears, it is the practice to double work them, which is to graft the best sorts into free stocks in the spring, which shoot the same year; then about midsummer, or soon after, to bud the young shoots of the graft with buds of the prime sorts of pear, suffering only the shoots from the second budding to run up to form the tree: the breaking kind of pears are often rendered less hard and stony in this way, and the melting property of others is considerably improved. See *PYRUS communis*.

For quinces, two sorts of stocks are occasionally used, as that of its own kind, and the pear stock; the quince stocks are raised from seed, suckers, and cuttings, &c., and the pear kinds from the kernels of any sort of pears; but as all the varieties of quinces are so expeditiously raised with certainty the same by layers and cuttings, it renders the raising of stocks for grafting or budding them on almost unnecessary. See *PYRUS Cydonia*.

For plums, the operation is performed only upon stocks of their own kind, raised from the stones of any sort of cultivated plum, or by suckers and layers, as the most certain methods to obtain any particular variety of free plum stock, as the muscle-plum stock, which many prefer as the best stock of all on which to work the finer kinds of plums, as generally producing very thriving moderate-growing, fruitful trees; raising it, not from seed, which would vary exceedingly, but by suckers from the root of real muscle-plum trees, or of those worked upon

the true muscle stock, or from layer stocks of the muscle-plum tree: the plum will also grow upon the apricot and cherry stock, but not in a thriving state for any length of time. See *PRUNUS domestica*.

For cherries, the proper stocks are those of the cherry kind only; as the great wild cherry stock for large trees, the cultivated garden cherries for the more moderate growths, and the bird-cherry stock for small dwarfs: the two former are raised from the stones of the fruit, and the latter also by seed, or by layers and cuttings: for general use, the wild black and red cherry stocks, being strong free growers, are preferable for all common large standard cherries, also the larger dwarf-trees for extensive walls and espaliers; as these stocks, being of strong hardy growth, generally produce larger, more hardy and durable trees than the cultivated cherry stocks: sometimes stocks of the morello and May cherry, as being moderate growers, are used to raise the smaller cherry-trees, either in dwarfs for low walls and espaliers, or for small or moderate standards; but the former when raised from layers is more certain of producing the real sort in its naturally moderate growth: the common bird-cherry, as being a very moderate grower, is used to raise dwarf cherry-trees, either to plant in borders, pots, forcing-frames, or to pot for forcing, &c.: they are raised plentifully from seed, cuttings and layers; and have the effect of dwarfing trees exceedingly, so as to bear fruit when but one or two feet high; and shooting very little to wood, generally bear abundantly for their size: and cherries will also grow upon plum, apricot, and laurel stocks, as being of the same genus. See *PRUNUS Cerasus*.

For apricots, these prove the most durable on stocks of the plum kind, as common plum stocks of any variety for all common wall, espalier, and standard trees; and the bullace stock for small dwarfs; the plum stocks are raised from the stones of any kind of cultivated plum, or by suckers from the root; and the bullace from seed, suckers, and layers: though they succeed almost equally well upon stocks of any kind of plum, it is probable they may prove the most successful on the muscle-plum stock, like peaches, &c., as being of a more moderate regular growth, and more prolific nature: the bullace stock is only used occasionally to raise moderate small dwarfs for low walls, or to plant in pots, or in forcing frames for forcing: the apricot will likewise grow on its own, and on peach and almond stocks raised from the stones, but never in so prosperous or durable a manner. See *PRUNUS Armeniaca*.

For peaches, several sorts of stocks are occasionally used; as almond, peach, nectarine, apricot, and plum stocks: they are all raised from the stones of the fruit, and the latter also by suckers and layers; but the plum stock, being the most hardy, is the most proper for general use; but the free plum stock is preferable for all the sorts of peaches and nectarines, as being productive of the most hardy, thriving, and durable trees; though it is remarkable, one sort of plum stock in particular is generally preferable on which to work peaches, which is that of the muscle-plum, as producing the most prosperous trees, and of a more moderate, regular, and fruitful growth, the fruit being of a superior quality, when the stocks are genuine; being raised from suckers or layers of the true muscle-plum-tree, or by suckers from the roots of such peach, nectarine, plum, &c., as are worked on muscle-plum stocks, which generally send up plenty from the roots annually; planting them off at one year's growth into the nursery to train them for use: double stocks, or double working, is sometimes used for the more delicate peaches, to improve their bearing, and the flavour of the fruit.

For nectarines, the same stocks as in the peach are used: as almond, peach, nectarine, apricot, and plum; all raised as for the peach tree: the plum stock should be preferred in general as for peaches.

For almond-trees, when raised for their fruit, the approved varieties may be budded into stocks of any sort of almond, peach, nectarine, apricot, or plum, raised from the stones, and the latter also from suckers, &c., but the trees are generally the most hardy and durable on plum stocks. See *AMYGDALUS*.

For medlars, three or four different stocks are occasionally used, to raise the approved varieties: as the medlar, white-thorn, pear, and quince stocks, the three former raised from seed, and the latter from suckers, layers, and cuttings; the medlar seedling-raised stocks are very proper to graft the approved varieties; and the white thorn and quince stocks are only used occasionally; but free stocks, raised from the kernels, of medlars or summer or autumn pears, are preferable to the two last for all the varieties of common medlar, which, either on their own or pear stocks, generally assume a more free growth, and produce the fruit in greater perfection and abundance. See *MESEFILUS*.

For sweet service-trees, when designed as fruit-trees, the approved varieties should be grafted or budded upon proper stocks; either principally their own raised from the seed, or occasionally on pear or quince stocks, raised as for

the medlar and other trees; though any of the sorbus, or the pear, are preferable to the quince to work this tree on to have it large and durable: but quince stocks may be used to have trees of smaller growth, for low standards, espaliers, &c.

For the wild maple-leaved service berry-trees, the proper stocks are either their own kind, or those of the hawthorn, raised from the seed; they also take upon pear stocks, &c.

For hazel nuts, filbert, &c., the stocks of the common nut-tree, raised either from the nuts, or by suckers from the root, may be used; but this method is seldom employed. See *CORYLUS avellana*.

For orange trees, these are worked upon stocks of their own kind only, as any kind of orange, lemon, or citron stocks, raised from the kernels of the fruit; though the Seville orange, as being a very free strong shooter, is generally preferred for orange stocks; but the lemon and citron being also free growers form very proper stocks to raise any variety of oranges on. See *CITRUS Aurantium*.

For lemon and citron trees, these varieties are also budded or inarched upon lemon, citron, or orange stocks, raised from the kernels of the fruit, as for oranges. See *CITRUS medica*.

It is evident, that in this method, for curiosity, the same stock may be made to support two, three, or more different varieties of fruit, grafted or budded, either all into the stock, being previously trained with branches, forking off for the purpose one for each graft, or by cleft, or crown-grafting single large stocks, with two or more different sorts; or in smaller single stocks, by inserting two or more different buds by inoculation; likewise, the stock being singly grafted or budded, different sorts may be inserted into the shoots arising from the graft or buds; and thus two, three, or more sorts of apples may be had on the same root; and by the same method, different sorts of fruit may be had upon the same stock, as plums, cherries, and apricots all on a plum stock; or peaches, nectarines, and apricots on the same, or on stocks of their own kind; and pears, medlars, and quinces upon the pear stock; also red and white currants, or currants and gooseberries, on a currant or gooseberry stock; or white and red grapes on a vine stock; likewise red and white roses, or other different sorts, upon a common rose stock; as well as on numerous other trees and shrubs, which are species or varieties of the same genus.

Raising the Stocks.—All the different sorts may be raised by seeds, suckers, layers, and cuttings.

In the first mode, various sorts of stocks may

be raised from the stones and fruits of different sorts of trees: as the kernels of all the apple kinds, pears and quinces; and the stones of plums, cherries, apricots, peaches, and nectarines; the seeds or stones of medlars, services, &c.; also nuts, when designed for stocks; all of which should be obtained in autumn from their respective fruits when fully ripened; and when well cleared from the pulpy substance, each sort may be sown separately, in beds of common light earth in the nursery, either directly, or after being preserved in sand till February, but the early autumn is the best season; and if the winter should prove severe, the beds of the more tender kinds, as almonds, and peaches, &c., may be covered with dry litter to defend the seed from the frost. See *NURSERY*.

Before the appearance of the plants above ground, where the surface of the bed is hard bound or caked, it is beneficial to stir the surface lightly with a small iron rake; also, if very dry weather prevails, to give frequent moderate waterings, both before and after the plants are up, repeating the waterings occasionally in dry weather all spring and early part of summer, to encourage a free strong growth; being likewise careful to keep the beds very clean from weeds by diligent hand-weedings; and by thus giving every encouragement, the seedling stocks will grow so freely during the summer, as by autumn or spring following to be mostly of a proper size to plant out into nursery lines in the open quarters, in rows two feet asunder, to remain for grafting and budding; though, if they have made but middling progress the first summer in the seed-bed, and are rather small and weakly, the strongest only should be planted out, leaving the rest growing until next autumn, when they will be all of full size for planting out wholly into the open prepared nursery quarters, forking the seedling plants up out of the beds, shortening any perpendicular tap-root and long stragglers, but leaving all their tops entire, and then planting them in lines, either by trench-planting, slit-planting, or dibble-planting, as the sizes of the plants admit, in rows two feet or two feet and a half asunder, setting the plants one foot or fifteen inches apart in each row, in an upright position; and after having planted one row, treading the earth gently all along close to the roots of the plants, to fix them firmly in the earth all evenly in a straight range, proceeding in the same manner, row and row, till the whole is planted, levelling the surface of the ground between all the rows with the spade or rake: their future culture, till grafted or budded, consists in occasional waterings in the first spring, hoeing over the ground every summer, digging

between the rows annually in the winter or spring; and training the stocks each to one stem; preserving their top always entire; but trimming off the strong laterals below, to encourage the strength of the main stem, when they will be fit for grafting or budding, in from one to two or three years. See PLANTING.

They are proper for working when from about the size of a large goose-quill, as already observed, to the thickness of a man's little finger, or a little more; but the sooner they are worked after they are of a due size, the better they succeed, and the sooner they form trees. See GRAFTING and BUDDING.

In some cases, however, where the stocks have shot freely the first summer after planting out from the seed-bed, many of them may probably be of a due size to graft the following spring and summer, at five or six inches height, to form dwarfs for walls and espaliers, &c., or even, in some sorts, for full or half standards, provided the first main shoot from the graft or bud is trained up singly, two or three years, to form the stem, of from four or five to six or seven feet stature: however, if they have grown but moderately the first and second seasons, and are not generally in a condition for the operation of grafting or budding, it is better to let them have another year's growth.

In the second mode, the suckers of all the trees which afford them should be planted off at one year's growth in autumn, winter, or spring, which is a very expeditious method of raising several sorts of stocks; so that, after being transplanted into the nursery, they often in one or two years' growth afford proper stocks for the reception of grafts and buds; and many of them are often fit for budding in the summer following, at the proper budding season, or for grafting the spring after.

The suckers are generally fit to take up for the purpose of stocks, when of one year's growth, about the size of a tobacco-pipe, or but little bigger, and should be collected in autumn or the early part of winter; taking them up as well rooted as possible, cutting off all knots or knobbed woody parts of the old roots that may adhere to their bottom, trimming the straggling fibres, and cutting off all side-shoots from the stem; then planting them in rows two feet asunder, and one foot distant in the lines; treading the mould gently to their roots, and finishing the work by levelling the surface between the rows: the culture afterwards, till grafted or budded, is nearly the same as that of the seedling stocks, keeping them clean from weeds in summer by hoeing; and probably some of the strongest shooters may be fit to bud in the July

VOL. II.

or August following; though the general part will require two years' growth before they are proper for working; still continuing them all to one stem, by timely displacing strong laterals, and preserving their top or leading shoot generally entire until grafted, &c.

The third method is practised for some sorts of stocks of fruit and other trees, and when any particular variety of stock is required, such as the paradise stock for apples, muske-plum for peaches, &c., that they may be obtained of the real sort with certainty: but as this method of raising stocks would be attended with great trouble for general grafting and budding, it is only practised occasionally. In providing them in autumn or winter, some of the young shoots of such trees as have the branches naturally growing near the ground, or in which the stems have been cut down low while young, to force out branches near the bottom, to furnish shoots properly situated for laying, should be slit-layed in the common method, when they will mostly be rooted by the autumn following, and be fit to take off and plant into the nursery, being managed as directed for the seedling and sucker stocks.

In the last method, cuttings of the last year's shoots should be chosen in autumn, planting them in the nursery, in a somewhat shady border, giving occasional waterings the following spring and beginning of summer in dry weather, when they will be mostly well rooted by next autumn, and may be then planted out in nursery-rows two feet asunder, managing them as the others: they should be kept with upright stems, except any should assume a stunted or crooked growth, in which case they should be headed down to the ground in spring, when they will push out strong from the bottom the ensuing summer, training them to one stem, and with their leading top-shoot entire as above; and according as all the sorts advance in growth, they should be divested of strong lateral shoots below, repeating it particularly in the taller standard stocks, to encourage their upright direction more expeditiously to the proper grafting and budding heights.

The proper methods of grafting, and budding are shown under the culture of the different kinds.

STONE-CROP. See SEDUM.

STONE-CROP TREE. See CHENOPodium.

STOOLS, such headed-down young trees and shrubs in the nursery as are appropriated for the production of an annual supply of lower shoots or branches near the ground, properly situated for layering. See LAYING.

Trees and shrubs for this purpose are generally headed down to the bottom in the nursery,

&c., in order to force out more effectually a plentiful supply of branches near the ground, to afford layers conveniently situated for laying down in the earth, which being layed in autumn, winter, or spring, they strike root in a year or two; each layer commencing a distinct plant, and is planted off into the nursery in autumn following; the stools, remaining, send out a further supply of lower shoots the following summer, for laying as before; and thus the same stools continue affording supplies fit for laying annually, or every other year: for this purpose, some of the strong young trees and shrubs should be chosen, which should be planted in the nursery, &c., at from five or six, to eight or ten feet distance, according to their size or nature of growth; and after having remained a year or two till firmly rooted, and they have acquired some substance, all those of the tree kind, or such others as run up with stems, without affording lower branches near the ground for laying, should, in the autumn, winter, or early in the spring, be headed down within a few inches of the ground; by which, in the summer following, they push out from the bottom plenty of strong young shoots near the ground for laying, which may be put down in the succeeding autumn, winter, or spring; or, if any remain, till the second autumn, the first shoots sending out many lateral or side shoots the ensuing summer, which may furnish an additional supply, of a proper growth for laying; these small laterals being often better adapted for rooting than the first vigorous shoots that rise immediately from the stool, and each of which layed will form a new plant. See LAYING.

Every year, soon after the layers are separated from the stools, the latter should be dressed, by cutting off all the parts of old branches and scraggy stumps from the head, within an inch or two of the main stool; and then digging and levelling the ground neatly about and between the whole, and in the spring and summer giving occasional hoeings in dry weather to destroy weeds: sometimes stools for layers are formed occasionally of trees, &c., that are considerably grown up, not having been headed down to form low stools, but the branches of which are of considerable height from the ground; in which case, the branches, if flexible and long enough, are bowed down to the earth; or, if inflexible and too stubborn to bend, are plashed, by making a gash or cut on the upper side; or if too large for plashing, or the nature of the wood does not bear that operation, the tree or shrub is sometimes thrown on its side by opening the earth about the roots, loosening or cutting those on one side to admit of lowering the

head sufficiently for laying the branches in the ground; and sometimes, when stools are formed from grown-up trees, whose branches are too high for laying in the full ground, a temporary stage or scaffold is erected, on which the pots or tubs of earth are placed for the reception of the layers. See LAYING.

STOVE, a sort of garden-building or erection constructed with brick-work behind and on the north, as well as partly in front, and roofed wholly with glass sashes to the south, being furnished internally with a pit, or long, wide, deep cavity, for a bark hot-bed or beds, and with flues round the inside of the walls for fire-heat; the whole calculated to produce a certain temperature at all seasons, adapted to the culture of the tenderest exotic plants, as well as for forcing various kinds, both hardy and tender, into flower and fruit, &c., at an early season; and which was so named before the use of bark-beds, from being worked only by means of fire-heat. See HOT-HOUSE.

Besides their use in the growth and preservation of various tender exotic plants as just noticed, by their means the gardener is also enabled to forward many hardy plants to early perfection; such as various sorts of curious flowers, fruits, salad-herbs, kidney beans, strawberries, &c., probably one, two, or three months sooner than they could possibly be obtained in the open ground; and likewise many sorts of seeds, cuttings, and layers of exotics are made to grow freely in the bark-bed of the stove, that without such aid would not grow at all in this country; also cuttings, &c., of many curious hardy plants that root reluctantly in the full ground, are facilitated considerably in their rooting by the bark-bed of this department.

Different sorts of stoves are used occasionally for different purposes; as the *Bark Stove*, for common use, which has both a bark-bed and flues: the *Dry Stove*, for particular succulent plants, &c., which is furnished only with flues for fire-heat, having no bark-bed: the *Forcing Stove*, which is employed purposely for forcing hardy fruits, flowers, &c., into early perfection; being constructed both with bark-bed and flues, or only with flues.

By the uniform moderate moist growing heat in the first sort of stove, many kinds of such plants as have been mentioned are brought forward and preserved, and in which, some require the bark-bed, others succeed in any part of the house; and still others, as the succulents, require the driest situation near the flues: many of the more tender, herbaceous, and shrubby plants succeed best when plunged in the bark-bed, though the greater part of the herbaceous and

whody sorts succeed well enough in any part: the bark-bed is principally allotted for the pine-apples; and most of the smaller succulents, particularly, may be stationed mostly over the top of the flues upon shelves out of the way of moisture, as being naturally very replete with humidity: and the hardy plants designed for forcing, such as strawberries, kidney beans, and various sorts of flowers, &c., that are potted, may be placed upon shelves, or on the parapet wall of the bark-bed; but the nearer the glasses the better, particularly the strawberries; but good early kidney beans may be raised in almost any part of the stove. When any sort of flowers are to be forwarded, such as roses, pinks, &c., or any bulbous flowers, as early as possible, they may be plunged in the bark-bed, and some be placed upon shelves, &c., to succeed them. See HOT-HOUSE.

The second sort of stove, from its affording a dry heat, is intended principally for the culture of very succulent tender exotics of parched soils, that require to be kept always dry. Where there are large collections of this sort of plants, it is very useful to deposit the most succulent of them in separate stoves, for fear of the others which perspire more freely occasioning a damp air in winter, which may be imbibed by the succulents, and injure them, as being impatient of much moisture, particularly in that season: in this kind of stove moveable stands or shelves are erected above one another, on which to place the pots of plants; such as the tenderer sorts of aloes, cereuses, euphorbiurns, melon-thistle, and other very tender succulent plants, &c.; but most of them may be cultivated in a common stove.

The third sort of stove is sometimes used principally for flowers, as is common about London, to force large quantities of early roses, pinks, and numerous other flowers for market, where they fetch a very great price at an early season: others are intended principally for fruit-trees, and some serve both for forcing flowers and fruits, and several sorts of small plants, as strawberries, kidney beans, &c.; so that they consist of two kinds, which are a bark forcing stove, furnished with a bark-bed and flues; and a fire forcing stove having only flues for fire without any bark-bed: the former of which is constructed like a common bark stove, being furnished with a pit for a bark-bed to receive the pots of particular sorts of plants intended for forcing, in order to forward them as early as possible; and with flues for fire-heat occasionally; and sometimes it is formed capacious enough in width to admit of a border of earth behind the bark-bed, next the back wall, serving for

fruit-trees, to be planted in the full ground; such as cherries, peaches, apricots, &c., for early forcing: the bark-bed is for receiving various sorts of plants in pots in winter, for forcing to maturity of growth or production in that season or early in spring; as pots of roses, pinks, dwarf tulips, hyacinths, narcissuses, honeysuckles, hypericums, and many other flower plants of small or moderate growth, both of the shrubby and herbaceous kinds; also any curious tender annual flowers, such as balsamines, &c., may be forwarded in it; likewise pots of strawberries, dwarf cherries, and other small fruits plunged either in the bark-bed, or placed any where towards the glasses; also pots or boxes of kidney-beans, salading, &c.

The season to begin forcing in these stoves is principally from about the latter end of December to the end of January, according as the flowers, fruits, &c., may be wanted; the plants and trees intended for forcing in pots should have been potted either a year before, or in the preceding spring or autumn, and in winter sheltered from severe frost till the forcing time: it is necessary for the shrub and tree kinds in particular, as if planted or potted the preceding year or before, and they are well rooted and firmly established in the earth, it is of essential advantage; being all previously raised in the open ground, till advanced to a proper growth for flowering and fruiting; and the fruit-trees at the same time, trained in the requisite order: those intended for planting in the internal border of earth behind should be planted fully therein early in autumn, without being potted; some of which, such as peaches, nectarines, apricots, &c., being trained as wall-trees, others as low standards, particularly cherries; and vines, planted also against the front without-side, have the stems trained in through small holes, and conducted up under the sloping-glasses; but such plants as are to be raised from seed should not generally be sown till the time the pots are placed in the stove for forcing.

When the plants, seeds, &c., have been properly arranged in these stoves, they are soon set in motion by the bark-bed heat, and afterwards by making moderate fires on cold nights, and on days occasionally, in very severe weather, to support a constant proper warmth to continue the plants always in moderate growth; by which means, various flowers and fruits may be obtained two or three months before their natural season in the open air.

The latter kind, or such stoves as are worked by fire-heat only, are mostly used for forcing fruit-trees, having the whole or most part of the bottom space within formed of good rich earth,

full two feet deep, in order to plant the fruit-trees entirely in the ground to remain; an alley or walk being either formed next the back wall, or carried along the middle, allotting a raised border along the back part, for the reception of the choicer fruits to be trained as wall-trees; and the main middle space for small standards of moderate growth: in these the best sorts of apricots, peaches, nectarines, cherries, plums, vines, and figs; likewise any small fruit plants, as gooseberries, currants, raspberries; also tufts of strawberries, which should all be first trained in the open ground to a bearing state; may be introduced: the peaches, nectarines, apricots, and figs, should be planted principally toward the back wall, and trained to a treillis as wall-trees: the cherries as standards, both small-headed, moderate, full standards, half standards, and dwarfs, disposed in the middle space, the tallest behind, and the lowest forward; with pots of strawberries and low flowers, upon shelves near the glasses; and the vines either within towards the front, or wholly without, close against the front wall, and the stems, or a strong shoot of each plant drawn in through a small hole made for each, either in the wall, or in the timber of the front erections; and the branches within trained up to the inside of the sloping glass upon treillis work: in the vines planted on the outside, it is necessary to guard the stems in winter, especially some time previous to, and during, the forcing season, with hay-bands wrapped closely round them, also to lay some dry mulch over the roots, to protect the whole as well as possible, that the progress of the sap may not be much retarded by the external cold, and to promote its flowing more freely for the advantage of the internal growth of the vines, &c.

The season to begin forcing or making the fires in these stoves is January, or early in February, continuing it moderately every night and morning, during the cold weather in winter and spring, to forward the different fruits to as early perfection as possible. See HOT-HOUSE.

STORAX. See STYRAX.

STOVE PLANTS, such tender exotics from the hot parts of the world as require the aid of the stove to preserve them in this climate.

The following are the principal sorts cultivated in this country in these departments:

TREE KINDS.

Abroma, Maple-leaved *Abroma*.
Achras Sapota, Mammee-tree—Common *Sapota*—Mammee *Sapota*.
Adansonia, Ethiopian Sour Gourd.
Adenanthera, Bastard Flower Fence—*Pavonia*—*Falcotaria*.
Anacardium, Acajow-, or Cashew-Nut.

Annona, Custard Apple—Nettled Custard Apple—Prickly Custard Apple—Scaly Custard Apple, or Sweet Sop—Marsh *Annona*, or Water Apple—Broad-leaved *Annona*.

Bombax, Silk Cotton-Tree—Thorny *Bombax*, or Cuba—Pentandrous Smooth *Bombax*—Hep-taphyllous Smooth *Bombax*.

Carica, Papaw or Pepo Tree—Common Indian Papaw Tree—Posoposa, or Branching Surinam Papaw Tree.

Cassia, Wild Sena—Purging-Tree *Cassia*—Billorous Shrub *Cassia*.

Cedrela, Bastard Cedar.

Chamaerops, Dwarf Palm, or Palmetto. (Fron-dose.)

Chiococca, Snowberry-Tree.

Chrysobalanus, Cocoa Palm.

Cinchona, Jesuit's Bark-Tree.

Clusia, Balsam-Tree.

Cocos, Cocoa-nut Tree. (Fron-dose.)

Crataeva, Garlic Pear.

Crescentia, Calabash Tree.

Croton, Tallow Tree.

Dracena, Dragon Tree.

Fagara, two species.

Ficus, Fig Tree—Sacred Fig, or Indian God-Tree—Sycamore Fig Tree—Bengal Fig Tree—Indian Long-leaved Fig Tree—Dwarf Indian Fig Tree.

Guaiacum, Lignum Vitæ; three species.

Guetarda, one species.

Guilandina, several species.

Hæmatoxylum, Blood-wood, or Log-wood..

Helicteres, Screw Tree.

Hernandia, Jack-in-a-Box Tree—Sonorous *Hernandia*—Oriental *Hernandia*.

Hymenæa, American Locust Tree.

Laurus, Bay Cinnamon Tree—Alligator Pear.

Mammea, Mammee Tree—American Mammee Tree—Asiatic Mammee Tree.

Mangifera, Mango Tree.

Melastoma, American Gooseberry.

Melia, Bead Tree—Evergreen Bead Tree of Ceylon—*Azadirachta*, or Indian Bead Tree.

Musa, Plantain Tree; all the three species.

Myrtus, Myrtle Tree—Pimento, or All-spice Tree—Diocious Myrtle—Brazilian Myrtle, &c.

Parkinsonia, Parkinsonia.

Physalis, Winter Cherry.

Robinia, False Acacia—Violet American *Robinia*—Smooth Indian *Robinia*.

Sapindus, Soap-berry Tree.

Swietenia, Mahogany Tree.

Tamarindus, Tamarind Tree.

Theobroma, Chocolate-nut Tree—Cocoa, or Chocolate-nut Tree—*Gauzuma*, or Bastard Cedar of Jamaica.

Tinus, several species.

Toluifera, Balsam of Tolu Tree.
Ximenia, American Prickly Ximenia—Unarmed Jamaica Ximenia.
Zamia, Dwarf American Palm. (Fronlose.)

SHRUBBY KINDS.

Abrus, Jamaica Wild Liquorice.
Amyris, Sweet Wood.
Apocynum, Dog's Bane—Shrubby Upright Ceylon Apocynum, with varieties—Climbing Dog's Bane, with varieties.
Banisteria, several species.
Bauhinia, Mountain Ebony—Prickly Bauhinia—Tomentose Bauhinia.
Begonia, Shining-leaved.
Bellonia, Rough-leaved.
Bixa, Dyeing Metella, &c.
Bocconia, Tree Celandine.
Bontia, Barbadoes Wild Olive.
Brunia, several species, either for the stove or greenhouse.
Brunsfelsia, Brunsfelsia.
Buddleia, American Buddleia—Occidental Buddleia.
Camellia, Japan Rose.
Capparis, Caper Bush.
Capsicum, Guinea Pepper—Shrubby Capsicum, with many varieties.
Catesbea, Lily Thorn.
Ceanothus, New Jersey Tea—Asiatic Ceanothus.
Celastrus, Staff Tree; two or three species for stove or green-house.
Cestrum, Bastard Jasmine, or Jasminoide.
Citharexylon, Fiddle Wood.
Cliffortia, three species, for stove or green-house.
Clitoria, three species.
Cluytia, Elutaria, or Indian Cluytia.
Coccoloba, Sea-side Grape.
Coffea, Coffee Tree.
Crotalaria, Laburnum-leaved.
Dracontium, Dragons.
Ehretia, two or three species.
Elæocarpus, one species.
Eriocephalus, three species, for the stove or green-house.
Erythrina, Coral Tree—Corallodendron, or Smooth Coral Tree—Spinous Coral Tree.
Gossypium, Cotton-plant; consists of herbaceous and shrubby species. See GOSSYPIMUM.
Grewia, Oriental Grewia.
Heliotropium, Turnsole.
Hibiscus, Syrian Mallow—Mutable-flowered Hibiscus, or China Rose—*Rosa Sinensis*, or Rose of China—Viscous Mallow, or Scarlet Hibiscus.
Indigofera, Indigo.
Ixora, Indian Wild Jasmine.

Lantana, American Viburnum—Trifoliate Lantana—Involucrum-headed Lantana—Camara, or Leafless-headed Lantana—Prickly Lantana.

Lawsonia, Lawsonia.
Lobelia, Cardinal-flower—Plumier's Lobelia—Surinam Lobelia—Pine-leaved Lobelia.
Loranthus, Loranthus.
Mesua, Indian Rose Chesnut.
Mimosa, Sensitive Plant. All the species.
Nerium, Oleander—Double-flowered—Striped-leaved.
Nyctanthes, Arabian Jasmine—Sambac, or Common Arabian Jasmine—Undulate-leaved Nyctanthes, or Malabar Jasmine—Arbor Tristis, or Sorrowful Tree—Hairy Sorrowful Tree.
Ophioxylon, Climbing Ophioxylon.
Panax, Genseng.
Pentapetes, Shrubby Pentapetes.
Phyllanthus, Sea-side Laurel.
Phytolacca, American Nightshade.
Piscidia, two species.
Poinciana, Barbadoes Flower Fence, &c.—Fair Poinciana, or Double-spined Barbadoes Flower Fence—Bijugated Single-spined Poinciana—Spineless Poinciana.
Portulaca, Purslane.
Ptelea, Shrubby Trefoil, Viscous Indian Ptelea.
Randia, two species.
Rauwolfia, Rauwolfia.
Rhamnus, Buckthorn—Spina Christi, or Ethiopian Jujube—Cenoplia, or Ceylon Jujube.
Rhus, Sumach—Cobbe, or Ceylon Sumach.
Sideroxylon, Iron Wood—Inermis, or Smooth Ethiopian Sideroxylon—Spinous Malabar Sideroxylon.
Solanum, Nightshade—Guinea Nightshade—Fiery-thorned Nightshade—Bahama Nightshade—Trilobate Nightshade, &c.
Sophora, Sophora.
Spothelia, Spothelia.
Tabernæmontana, Tabernæmontana.
Tournefortia, Shrubby Tournefortia—Vulbilate or Twining Tournefortia—Fætid or Stinking Tournefortia—Hairy Tournefortia—Serrated Tournefortia—Cymose Tournefortia.
Vinca, Periwinkle—Rose Periwinkle of Madagascar.
Vitis, Vine—Indian Wild Vine—Trifoliate Indian Vine.

UNDER-SHRUBBY KINDS.

Acanthus, Bear's Breech—Shrubby Holly-leaved Acanthus.
Volkameria, Prickly Volkameria—Unarmed or Smooth Volkameria.

HERBACEOUS KINDS.

Achyranthes, Bloody or Red Indian Achyranthes—Woolly-cupped Indian Achyranthes.

leaved Euphorbia—Medusa's Head Euphorbia—
Tithymeloid Euphorbia, or Bastard Spurge.

Glaxinia, one species.

Stapelia, Variegated Stapelia—Hairy Stapelia.

BULBOUS KINDS.

Antholyza, Æthiopian Corn Flag; several species.

Crimum, Asphodel Lily—American Asphodel Lily—Asiatic Asphodel Lily.

Limodorum, Limodorum.

Massonia, Broad-leaved—Narrow-leaved.

Pancratium, (Pancratium Lily) Sea Daffodil—
Ceylon Uniflorous Pancratium—Mexican Biflorous Pancratium—Caribbean Multiflorous Pancratium—Amboyna Broad-leaved Pancratium.

Some of these sorts of plants are also inserted in the green-house list; as, where there is no stove, they may be preserved tolerably well in a good greenhouse.

STRAWBERRY. See FRAGARIA.

STRAWBERRY BLITE. See BLITUM.

STRAWBERRY SPINACH. See BLITUM.

STRAWBERRY TREE. See ARBUTUS.

STRELITZIA, a genus affording a plant of the herbaceous exotic perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Scitamineae*.

The characters are: that the calyx is an universal spathe, terminating, one-leaved, channelled, acuminate, from spreading declining, many-flowered, involving the base of the flowers; partial spathes lanceolate, shorter than the flowers: perianth none: the corolla is irregular: petals three, lanceolate, acute; the lowest boat-shaped; the two upper bluntly keeled: nectary three-leaved: the two lower leaflets a little shorter than the petals, from a broad base awl-shaped, waved at the edge, folded together, including the genitalia, towards the tip behind augmented with a thick appendix, in form of half an arrow head; the lowest leaflet short, ovate, compressed, keeled: the stamina have five filaments, filiform, placed on the receptacle: three is one leaflet of the nectary; two with the style inclosed in the other leaflet: anthers linear, erect, commonly longer than the filaments, included: the pistillum is an inferior germ, oblong, obtusely three-cornered: style filiform, length of the stamens: stigmas three, awl-shaped, higher than the petals, erect, at the beginning of flowering time glued together: the pericarpium is a subcoriaceous capsule, oblong, obtuse, indistinctly three-cornered, three-celled, three-valved: the seeds numerous, adhering in a double row to the central receptacle.

The species is *S. Reginae*, Canna-leaved Strelitzia.

It has all the leaves radical, petioled, oblong, quite entire, with the margin at bottom waved and curled, very smooth, glaucous beneath, coriaceous, a foot long, permanent: the petioles somewhat compressed, three feet long and more, the thickness of the thumb, sheathing, erect, smooth: the scape the length and thickness of the petioles, erect, round, covered with alternate, remote, acuminate sheaths, green with a purple margin: the general spathe a span long, green on the outside, purple at the edge; partial spathes whitish: the petals yellow, four inches long: the nectary blue: according to Curtis, the spathe contains about six or eight flowers, which becoming vertical as they spring forth, form a kind of crest, which the glowing orange of the corolla, and fine azure of the nectary, render truly superb. A native of the Cape.

Culture.—These plants are raised from seeds, brought from their native situation, and sown in pots of good fine mould, plunged in a hot-bed to get them up; the plants when of some growth should be removed into separate pots, and be replunged in the tan-pit of the stove; afterwards, when the plants are large, they should have plenty of mould, that the roots may be extended into the rotten tan, and in that way render them more strong for blowing their flowers: it may likewise sometimes be raised from the roots, when they are suffered to strike in the above manner; it is said to succeed best in the dry stove and conservatory.

It is highly ornamental among stove plants.

STUARTIA, a genus furnishing a plant of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved perianth, half-five-cleft, spreading; segments ovate, concave, permanent: the corolla has five petals, obovate, spreading, equal, large: the stamina have numerous filaments, filiform, united into a cylinder below, shorter than the corolla, connecting the petals at the base: anthers roundish, incumbent: the pistillum is a roundish germ, hirsute: style simple, filiform, length of the stamens: stigma five-cleft: the pericarpium is a juiceless pome, five-lobed, five-celled, soluble into five closed parts: the seeds solitary, ovate, compressed.

The species cultivated is *S. Malacodendron*, the Malacodendron.

It is a shrub, rising with strong ligneous stalks to the height of ten or twelve feet, sending out branches on every side covered with a brown bark, and garnished with oval spear-shaped leaves, about two inches and a half broad, sawed

on the edges, pretty much veined, and stand alternately: the flowers are produced from the wings of the stalk; they are white, with one of the segments of a yellowish tinge: it flowers in the latter end of May. It grows naturally in Virginia.

Culture.—This plant may be increased by seeds, layers, and occasionally by cuttings: the seeds should be procured from abroad, and sown in pots, filled with light earth, in the early spring, plunging them in a good hot-bed, watering them well now; and when the plants are up protecting them under frames, or in the green-house, for two or three winters, and hardening them in the summer, then putting them into small pots separately, in the spring placing them in the hot-bed till fresh rooted, watering them occasionally, and giving proper shade till fresh rooted, then hardening them for the summer, but protecting them in the following winter: then in the spring following, when the weather is fine and settled, turning them out with balls about their roots into the open ground, placing them in a warm situation. The young shoots may be laid down early in the autumn, in the slit method, watering them frequently in the following spring and summer, and shading them from excessive heat: when well rooted, in the following spring they may be taken off and planted out in separate pots, plunging them in a hot-bed till they have taken fresh roots, when they should be managed as the others.

The cuttings of the young shoots should be planted out in the spring, in pots of fine light mould, plunging them in a hot-bed; and when they have stricken good roots they may be removed into separate pots and managed as the others.

These plants afford ornament and variety in shrubberies, and among potted plants.

STYRAX, a genus furnishing an aromatic deciduous tree of the exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leaved perianth, cylindric, erect, short, five-toothed: the corolla one-petalled, funnel-form: tube short, cylindric, length of the calyx: border five-parted, large, spreading; segments lanceolate, obtuse: the stamina have ten filaments, erect, in a ring, scarcely united at the base, awl-shaped, inserted into the corolla: anthers oblong, straight: the pistillum is a superior germ, three-celled, many-seeded: style simple, length of the stamens: stigma truncate: the pericarpium is a roundish drupe, one-celled: the seeds are nuts one or two, roundish, acuminate, convex on one side, flat on the other.

The species is *S. officinale*, Official Storax.

It rises in its native situation twelve or fourteen feet high: the trunk is covered with a smooth grayish bark, and sends out many slender branches on every side; the leaves about two inches long, and an inch and half broad, of a bright green on their upper side, but hoary on their under; they are entire, and placed alternately on short footstalks: the flowers come out from the side of the branches, upon peduncles sustaining five or six flowers in a bunch; are white, and appear in June. It is a native of Italy and the Levant.

Culture.—It may be increased by seeds, obtained from abroad, by sowing them in pots of light earth an inch deep; and as they are of a hard stony nature, and rarely come up the first year, the pots should be plunged under a frame during cold weather, and be in the shade in summer, and in the second spring be plunged in a hot-bed to forward them, being careful to give water, and to harden the young plants gradually to the full air in summer, in a shady place during the hot weather, being often watered; and in winter the pots be replaced under a garden-frame, &c., to have shelter from frost; then in spring following let them be potted off separately, and managed as hardy green-house plants for three or four years, when some of them may be turned out into the full ground in a sheltered situation, trained against a south wall, and some may be retained in pots for the green-house collection: they afford ornament and variety in these different situations.

STYRAX. See LIQUIDAMBAR.

SUBER. See QUERCUS.

SUCKERS, such young offspring plants as arise immediately from the roots of older vegetables, and which, being generally furnished also with roots, when transplanted, readily grow, and become proper plants, similar to the mother ones.

They are proper for increasing their kinds by in many cases, and in certain instances a sure method to continue any approved or desirable species or variety; but in grafted and budded trees, the suckers partake only of the nature of the stock.

Some sorts of trees furnish plenty every summer, which are often furnished with root-fibres, affording proper plants for setting out in one season, and of course become a ready means of increase: in trees, &c., that are wholly the same sort, root and top, they prove the same invariably in every mode of growth, as certainly as by layers, cuttings, grafting, &c.

The season for taking up or transplanting suckers of trees and shrubs, is almost any time, in open weather, from October till March, being careful to dig them up from the mother plant with as much root-fibres as possible, and trim-

ring them ready for planting, by shortening the long straggling fibres, and cutting off any thick-knobbed part of the old root that may adhere to the bottom, leaving only the fibres arising from the young wood; though it is probable some will appear with hardly any fibres; but as the bottom part having been under ground, and contiguous to the root of the main plant, is naturally disposed to send forth fibres for rooting, preparatory to planting them out, the stems of the shrub and tree suckers should likewise be trimmed occasionally, by cutting off all lower laterals; and any having long, slender, and weak tops, or such as are intended to assume a more dwarfish or bushy growth, may be shortened at top in proportion, to from about half a foot to one or two feet in length, according to their nature or strength; and others that are more strong, or that are designed to run up with taller stems, may have their tops left entire, or shortened but little: when thus taken up and trimmed, they should be planted out in rows in the nursery; the weak suckers separately in close rows; and also the shortened and stronger plants each separately in wider rows; so that the rows may be from one to two feet asunder, in proportion to the size and strength of the suckers: and after being thus planted out, they should have the common nursery culture of cleaning from weeds in summer, and digging the ground between the rows in winter, &c., and in from one to two or three years they will be a proper size for planting out where they are to remain: and some kinds of trees, &c., produce suckers strong enough in one season to be fit for planting where they are to remain: as some sorts of roses, and numerous other flowering shrubs; also some of the strong shooting gooseberries, currants, raspberries, &c.

The increase by suckers, as in some particular sorts of trees and shrubs, as currants and gooseberries, &c., is objected to for any general supply, on the supposition that the trees so raised are more adapted to run too greatly to suckers, and overrun the ground round the mother plant, than such as are raised by other methods: however, it may generally be observed of such trees and shrubs as are naturally disposed to send up many suckers, that by whatsoever method they are propagated, whether by seeds, suckers, layers, cuttings, &c., they commonly still continue their natural tendency.

When it is therefore required to have any sorts produce as few suckers as possible, not to overrun the ground, or disfigure the plants, it is proper both at the time of separating the suckers, or planting them off from the main plants, and at the time of their final removal from the nursery, to observe if at the bottom part they

Vol. II.

show any tendency to emit suckers, by the appearance of prominent buds, which, if the case, should all be rubbed off as close as possible: as, however, many sorts of trees and shrubs are liable to throw out considerably more than may be wanted, they should always be cleared away annually at least, and in such as are not wanted for increase, it is proper to eradicate them constantly, as they are produced in spring and summer.

Numerous herbaceous and succulent plants are productive of bottom off-set suckers from the roots, by which they may be increased, either generally or occasionally, according to the different sorts, both of the fibrous-, bulbous-, and tuberous-rooted tribes; all the off-sets from the root, and above-ground bottom side heads, of these kind of plants, may be deemed a sort of suckers: those for planting should be taken off when of one summer's growth, or two at most, which, in the fibrous-rooted kind, may be performed in autumn or spring; and in the bulbous-, and many of the tuberous-rooted sorts, in summer and autumn, when the stalks and leaves decay.

In slipping and planting these sorts of off-set suckers, the smaller ones should be planted in nursery-beds, pots, &c., according to the nature of growth and temperature of the different sorts, to have the advantage of one summer's advanced growth; and the larger ones at once, where they are to remain, in beds, borders, pots, &c., according to the sorts.

SUGAR CANE. See SACCHARUM.

SUGAR MAPLE. See ACER.

SULTAN, SWEET. See CENTAUREA.

SUMACH. See CORIARIA and RHUS.

SUMMER CYPRESS. See CHENOPodium.

SUN, the luminary that affords light and heat to plants and vegetables, and is the first mover of all their actions; by the genial heat which it affords, and its influence upon the soils, it promotes the growth of them all.

Plants, therefore, which in their growth are more or less exposed to the sun, are, for the most part, more prosperous, forwarder, and attain greater perfection than such as grow in any considerable shade: and most fruits in a sunny exposure are considerably more beautiful, sooner ripe, and acquire superior quality in flavour, &c. to those growing in shady places: and as it has a highly fertilizing effect upon the earth, the ground designed to be mellowed should always be turned up in rough ridges, to give free access to the influence of the sun and air; likewise all compost heaps should generally be prepared in sunny situations, in the full air, not in shady corners, or in sheds, as is often practised by gardeners.

3 M

SUN-DEW. See DROSEREA.
 SUN-FLOWER. See HELIANTHUS.
 SUN-SPURGE. See EUPHORBIA.
 SWALLOW-WORT. See ASCLEPIAS.
 SWEET APPLE. See ANNONA.
 SWEET BRIER. See ROSA.
 SWEET FLAG. See ACORUS.
 SWEET GUM. See LIQUIDAMBAR.
 SWEET JOHNS. See DIANTHUS.
 SWEET MAUDLIN. See ACHILLEA.
 SWEET PEA. See LATHYRUS.
 SWEET RUSH. See ACORUS.
 SWEET SOP. See ANNONA.
 SWEET SULTAN. See CENTAUREA.
 SWEET WEED. See CAPRARIA and SCOPARIA.

SWEET WILLIAM. See DIANTHUS.
 SWEET WILLOW. See MYRICA.

SWIETENIA, a genus furnishing a plant of the exotic tree kind for the stove.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Trihilatae*.

The characters are: that the calyx is a one-leaved perianth, five-cleft, obtuse, very small, deciduous: the corolla has five petals, obovate, obtuse, concave, spreading: nectary one-leaved, cylindric, length of the petals, mouth ten-toothed: the stamina have ten filaments, very small, inserted below the teeth of the nectary: anthers oblong, erect: the pistillum is an ovate germ: style awl-shaped, erect, length of the nectary: stigma headed, flat: the pericarpium is an ovate capsule, large, woody, one-celled, at the top five-celled, five-valved, valves opening at the base: the seeds very many, imbricate, compressed, oblong, obtuse, having a leafy wing: receptacle large, five-cornered.

The species cultivated is *S. Mahagoni*, Mahogany Tree.

In its native state it is a lofty and very branching tree, with a wide handsome head; the leaves reclining, alternate, shining, eight inches long, numerous on the younger branches: leaflets for the most part four pairs, but often three, seldom five, without any odd one, falcate-lanceolate, quite entire, acuminate, bent in backwards, petioled, opposite, an inch and half long: the racemes subcorymbed, with about eight flowers in each, axillary, solitary, two inches long; the flowers are small, whitish; the capsule large, (sometimes attaining the size of a child's head,) woody, ovate, of a smoky-rufescent colour (or ferruginous), towards the top five-celled, but in other parts widely one-celled, five-valved: valves thick, opening from the base, caducous, covered within by a thick flexible coriaceous lamina, exactly equal to them in size. A native of the warmest parts of America, &c.

Culture.—This plant may be increased by sowing the seeds obtained from abroad in small pots, filled with light sandy mould, in the spring, plunging them in a hot bed, and watering them occasionally: when the plants are a few inches high, they should be carefully removed into other pots separately, replunging them in the hot-bed, giving them shade till re-rooted; they should afterwards have the management of other stove plants. They afford variety and curiosity in stove collections.

SYMPHYTUM, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a five-parted perianth, erect, five-cornered, acute, permanent: the corolla one-petalled, bell-shaped: tube very short: border tubular-bellied, a little thicker than the tube: mouth five-toothed, obtuse, reflexed: throat fenced by five lanceolate rays, spinulose at the edge, shorter than the border, converging into a cone: the stamina have five awl-shaped filaments, alternate with the rays of the throat; anthers acute, erect, covered; the pistillum is as four germs: style filiform, length of the corolla: stigma simple: there is no pericarpium: calyx larger, widened: seeds four, gibbous, acuminate, converging at the tips.

The species cultivated are: 1. *S. officinale*, Common Comfrey: 2. *S. tuberosum*, Tuberous-rooted Comfrey, 3. *S. orientale*, Oriental Comfrey.

The first has a perennial root, fleshy, externally black; the stem two or three feet high, upright, leafy, winged, branched at the top, clothed with short bristly hairs that point rather downward: the leaves waved, pointed, veiny, rough; the radical ones on footstalks, and broader than the rest; the clusters of flowers in pairs on a common stalk, with an odd flower between them, recurved, dense, hairy: the corolla yellowish-white, sometimes purple: the rays downy at each edge. It is a native of Europe and Siberia.

There are varieties with white flowers, purple flowers, with blue flowers, and with red flowers.

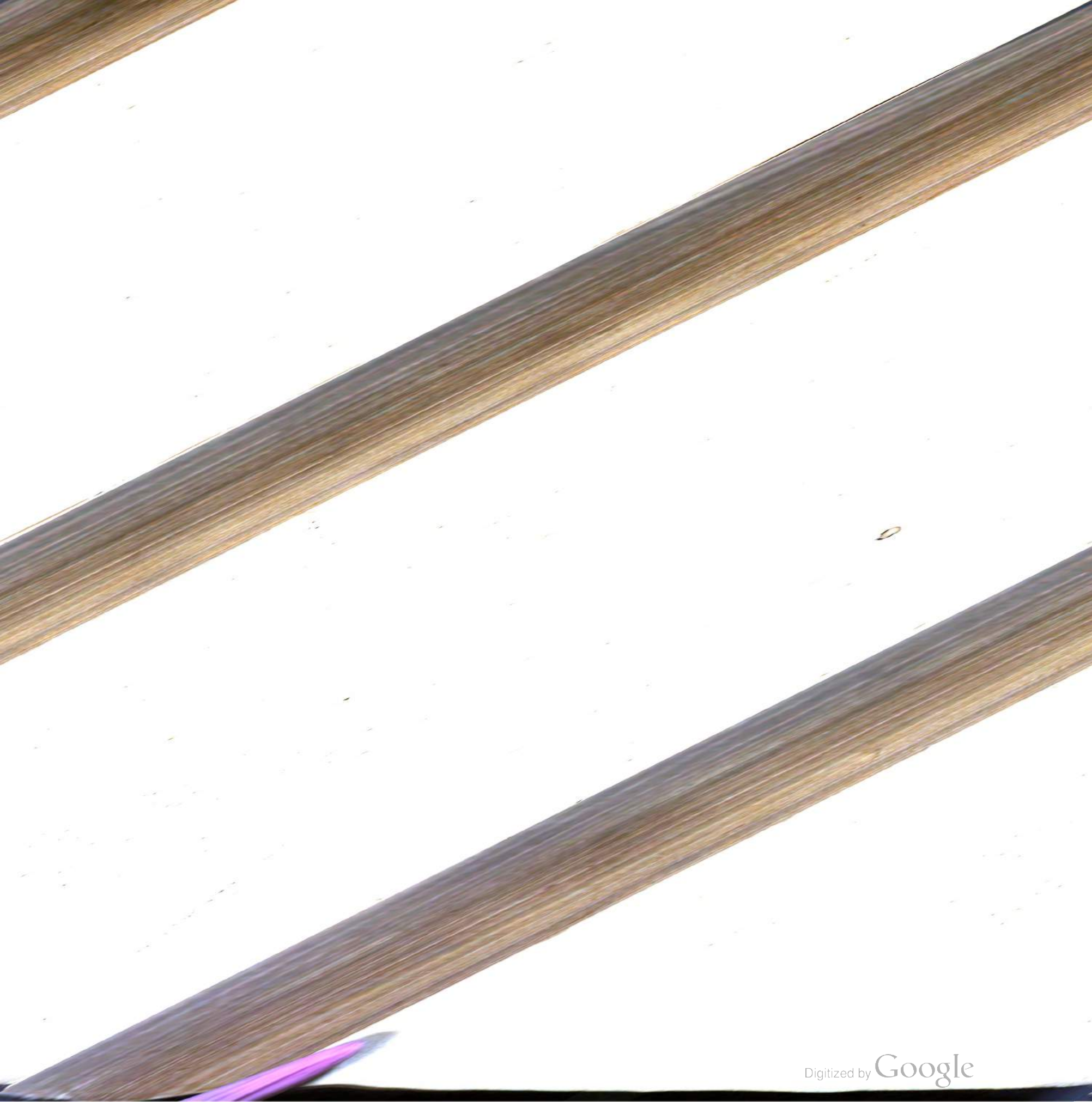
The second species has the roots composed of many thick fleshy knobs or tubers, which are joined by fleshy fibres: the stalks rise a foot and half high, and incline on one side: the leaves on the lower part are six inches long, and two inches and a half broad in the middle, ending in acute points, and not so rough and hairy as the first; they are alternate and sessile: the two upper leaves on every branch stand opposite, and just above them are loose bunches of pale yellow flowers, the corolla of which is stretched out further beyond the calyx than in the com-



Painted by Syd. Edwards London Published July 1846 by G. Kearsley Fleet Street Engraved by F. Sanford.

1 *Symphytum orientale*
Eastern Comfrey.

2 *Salvia indica*.
Indian Sage.





Painted by Syd Edwards

London Published May 1850. by G. Kearsley Fleet Street

Engraved by E. Sanfem

1 *Syringa vulgaris*
*Lilac*2 *Sarracena flava*
Yellow Sarracena

mon sort. It is a native of Germany, &c., and flowers from May to October.

The third has a perennial root: the stalks two feet high: the leaves rounder, and armed with rough prickly hairs: the flowers in bunches like the first sort, but blue: they appear in March, but seldom produce seeds in this climate. Found near Constantinople.

Culture.—These plants may be increased by seeds or parting the roots, but the latter is more practised. The seeds should be sown in the spring, in a border of common earth; in the autumn the plants will be proper to set out where they are to remain, or to remove into other pots. The roots should be parted in the autumn, and planted out either in beds about a foot from plant to plant, or where they are to remain; almost every part will grow, and the plants are hardy, and succeed in any soil or situation: they only require to be kept clean afterwards. They produce variety in mixture in the borders.

SYRINGA, a genus containing plants of the deciduous flowering shrubby kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Sepiaria*.

The characters are: that the calyx is a one-leaved perianth, tubular, small: mouth four-toothed, erect, permanent: the corolla one-petalled, funnel-form: tube cylindric, very long: border four-parted, spreading and rolled back: segments linear, obtuse: the stamina have two filaments, very short: anthers small, within the tube of the corolla: the pistillum is an oblong germ: style filiform, length of the stamens: stigma bifid, thickish: the pericarpium is an oblong capsule, compressed, acuminate, two-celled, two-valved: valves contrary to the partition: the seeds solitary, oblong, compressed, acuminate at both ends, with a membranaceous edge.

The species cultivated are: 1. *S. vulgaris*, Common Lilac: 2. *S. Persica*, Persian Lilac.

The first is a shrub, which grows to the height of eighteen or twenty feet in good ground, and divides into many branches; those of the White sort grow more erect than the Blue; and the Purple or Scotch Lilac has its branches yet more diffused. The branches of the White are covered with a smooth bark of a gray colour; in the other two it is darker; the leaves of the White are of a brighter green; they are heart-shaped in all, almost five inches long, and three inches and a half broad near the base, placed opposite, on foot-stalks an inch and half in length. The buds of the future shoots, which are very turgid before the leaves fall, are of a very bright green

in the White sort, but those of the other two are dark green. The flowers are always produced at the ends of the shoots of the former year; and below the flowers other shoots come out to succeed them; as that part upon which the flowers stand decays down to the shoots below every winter. There are generally two bunches or panicles of flowers joined at the end of each shoot; those of the Blue are the smallest, the flowers also are smaller, and placed thinner than either of the others; the bunches on the White are larger, but those of the Scotch are larger still, and the flowers fairer; it of course makes the best appearance: the panicles of flowers grow erect, and, being intermixed with the bright green leaves, have a fine effect, which with the fragrant of the flowers, renders it one of the most beautiful shrubs of the garden: the flowers appear early in May, or towards the end of April, and when the season is cool continue three weeks; but in hot seasons soon fade. It is supposed a native of Persia.

There are several varieties: as with white flowers, with blue flowers, with purple flowers, or Scotch Lilac.

The second species is a shrub of much lower growth than the common sort, seldom rising more than five or six feet high: the stems are covered with a smooth brown bark: the branches are slender, pliable, extend wide on every side, and frequently bend down where they are not supported: the leaves two inches and a half long, and three fourths of an inch broad, of a deep green colour: the flowers in large panicles at the end of the former year's shoots, as in the former; of a pale blue colour, and having a very agreeable odour. They appear at the end of May, soon after those of the common sort, and continue longer in beauty, but do not perfect their seeds in this climate.

There are several varieties: as the common purple-flowered, white-flowered, blue-flowered, and the lacinated or cut-leaved.

Culture.—These plants are mostly raised by suckers or layers, and sometimes by seeds. The suckers should be taken off in the autumn or spring, with root-fibres to them, and be planted out either in nursery-rows, to remain a year or two, or where they are to remain. The layers may be made from the young pliant shoots, and be laid down in the autumn, in the usual way, when in the autumn following they may be taken off and planted out, as in the suckers. The first sort may likewise be raised from seeds sown in a bed of common earth, in the autumn or spring, keeping the plants clean when they come up. They afford variety in the large borders and other parts of shrubberies.

TABERNÆMONTANA, a genus containing plants of the woody exotic and hardly perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-cleft perianth, acute, converging, very small: the corolla one-petalled, funnel-form; tube cylindric, long; border five-parted, flat; segments obtuse, oblique: nectary glands five, bifid, standing round the germ: the stamina have five filaments, very small, from the middle of the tube: anthers converging: the pistillum has two simple germs; style awl-shaped; stigma oblong, headed: the pericarpium has two follicles, horizontally reflexed, ventricose, acuminate, one-celled, one-valved: the seeds numerous, ovate-oblong, obtuse, wrinkled, immersed in pulp, imbricate.

The species cultivated are: 1. *T. citrifolia*, Citron-leaved Tabernæmontana; 2. *T. laurifolia*, Laurel-leaved Tabernæmontana; 3. *T. Amsonia*, Virginian Tabernæmontana; 4. *T. angustifolia*, Narrow-leaved Tabernæmontana.

The first rises with an upright woody stalk, to the height of fifteen or sixteen feet, covered with a smooth gray bark, abounding with a milky juice, and sending out several branches from the side, which grow erect, and have many joints: the leaves are thick, milky, from five to six inches long, and two inches broad in the middle, drawing to a point at each end; they are of a lucid green, have many transverse veins, and stand opposite on footstalks an inch long: the flowers come out in roundish axillary bunches; they are small, of a bright yellow colour, and have an agreeable odour. It is a native of Jamaica, Martinico, &c.

The second species rises with a shrubby stalk twelve or fourteen feet high, sending out a few branches towards the top, which grow erect: the leaves are four inches long and two broad, of a lucid green colour: the flowers are produced in a sort of umbel from the side of the branches; are small, yellow, and have an agreeable odour. It is a native of Jamaica, St. Domingo, &c.

The third is a perennial plant, sending up in the spring two or three herbaceous stalks near a foot high: the flowers are produced in small terminating bunches, white and void of scent. It is a native of North America, flowering in May and June.

The fourth species is a perennial plant, native of North America, flowering in May and June.

Culture.—These plants may be increased by seeds, which must be procured from the countries where the plants grow naturally, and be sown early in the spring on a hot-bed; and when the plants are come up, and fit to remove, be carefully planted out into small pots filled with light rich earth, and then plunged into a hot-bed of tanner's bark, being careful to shade them in the heat of the day until they have taken new root; after which they should have free air admitted to them every day when the weather is warm; but on cold nights have the glasses of the hot-bed covered with mats every evening, soon after the sun goes off from the bed: they must be often refreshed with water, but not in large quantities, especially while they are young, as they are full of a milky juice, and are subject to rot with much moisture: they may remain during the summer season in the hot-bed, by stirring up the tan to renew the heat when it wants, and a little new tan being added; but when the nights begin to be cold, the plants should be removed, and plunged into the bark-bed in the stove, where, during the winter season, they must be kept in a moderate degree of warmth, and in cold weather have but little water given them: they should constantly remain in the stove, where, in warm weather, they may have free air admitted to them by opening the glasses, but in cold weather be kept warm. With this management they thrive and produce flowers; and, as their leaves are always green, make a pleasant diversity among other tender exotic plants: they may be increased likewise by cuttings in the summer season, which should be cut off from the old plants, and laid to dry in the stove five or six days before they are planted, that the wounded parts may heal over: these should then be planted in pots filled with fresh light earth, and plunged into the hot-bed of tanner's bark, and closely covered with a hand-glass, shading them from the sun in the middle of the day in hot weather, refreshing them now and then with a little water: when they have taken root, they may be planted out into separate pots, and be treated in the same manner as those raised from seeds.

The third and fourth sorts are capable of living in the open air here, provided they are planted in a warm situation; they love a light soil, rather moist than otherwise; of course, when planted in dry ground, they should be frequently watered

reased by off-sets
be planted out in
society in the stove,
as well as the borders.

ULUS.
ing plants of the

order *Syngenesia*
ks in the natural
ia.

the calyx is com-
tubular, oblong,
the corolla com-
aphrodite, tubu-
females ligular,
hermaphrodites,
longer than the
rdly villose:—in
than in the her-
ngth and breadth,
he tube, tomen-
n the hermaphro-
very short: an-
pistillum in the
: style filiform,
a bifid, slender,
m oblong: style
brodite: stigma
no pericarpium:
the hermaphro-
d, a little shorter
e, erect, acumi-
females like the
small, flat.

1. *T. patula*,
African Mary-

ot and half high,
used: the leaves
a winged rachis)
e smooth, dark-
d punched: the
old-coloured, on
is probably a na-
July to autumn.
the pale yellow-
golden yellow-
lvetty, variegated
nson and yellow;
d double flowers.
tem three or four
en, dividing from
es, each bearing
ng, pinnate; leaf-
yellow, from brim-
native of Mexico.
h pale-yellow or

brimstone-coloured flowers, with deep yellow
flowers, with orange-coloured flowers; each
with single, double, and fistulous flowers; the
middling African, with orange-coloured flowers,
and the sweet-scented African.

Culture.—These plants are increased by seeds,
which should be sown in the beginning of
April upon a hot-bed, and when the plants ap-
pear, they should have plenty of fresh air, and
after they have attained some growth be trans-
planted on to another hot-bed, which is arched
over by hoops, at the distance of six inches,
watering and shading them well till fresh rooted,
being afterward gradually inured to the open
air; and about the beginning of May they may
be taken up with balls of earth about their roots,
and planted in pots, to be set out in the courts,
yards, &c., about the house, shading them till
fresh rooted, and giving them water occa-
sionally: but the first sort divides and spreads
out widely near the ground, in a rambling man-
ner, and requires to be trimmed up at bot-
tom to a single stem, and its branches occa-
sionally, to preserve the head somewhat regular,
and within due bounds.

The second species in particular, and the va-
rieties, as they always grow firmly erect, both
in stem and branches, require but very little
trouble after their final planting out: they afford
ornament and variety among other plants, in
the borders, clumps, and other parts of pleasure-
grounds, as well as in pots for particular places
about the house, among other potted annual
plants. The seeds of each species, and their
varieties, should be annually saved from the
best plants.

TALLOW TREE. See CROTON.

TAMARINDUS, a genus containing a plant
of the exotic tree kind.

It belongs to the class and order *Monadelphia*
Triandria, (*Triandria Monogynia*,) and ranks
in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-
leafed perianth; tube turbinate, compressed,
attenuated below, permanent; mouth oblique;
border four-parted, deciduous; segments ovate,
acute, flattish, reflexed, coloured; the upper
and lower a little wider: the corolla has three
petals, ovate, concave, acute, crenate, waved,
reflexed, length of the calyx, inserted into the
mouth of the tube, the two lateral ones a little
larger: the stamina have three filaments, in-
serted into the orifice of the calyx at the void
sinus, length of the corolla, awl-shaped, united
below up to the middle, bowed towards the co-
rolla: anthers ovate, incumbent, large: threads
five (rudiments of stamens), alternate with the
filaments, and united below, but separate above,

bristle-shaped, headed, very short; the two lateral ones lower than the others; bristles two, springing from the calyx below the filaments, and incumbent on them, very small: the pistillum is an oblong germ, compressed, curved in, placed on a pedicel fastened to the bottom of the calyx, and growing longitudinally to its tube under the back, beyond the tube, with the upper margin villose: style awl-shaped, ascending, pubescent on the lower margin, a little longer than the stamens: stigma thickened, obtuse: the pericarpium is a legume, oblong, compressed, blunt with a point, swelling at the seeds, covered with a double rind, the outer dry and brittle, the inner membranaceous; a soft pulp between both; one-celled, not opening: the seeds few, angular-roundish, plano-compressed, shining, hard.

The species is *T. Indica*, Tamarind-tree.

It grows to a very large size in the countries where it is a native: the stem is very large, covered with a brown bark, and divides into many branches at the top, spreading wide every way; the leaves pinnate, composed of sixteen or eighteen pairs of leaflets, without a single one at the end; they are about half an inch long, and a sixth part of an inch broad, of a bright green, a little hairy, and sit close to the midrib: the flowers come out from the side of the branches, five, six, or more together, in loose bunches; the pods are thick and compressed; those from the West Indies from two to five inches in length, with two, three, or four seeds; those from the East Indies are almost twice as long, and contain five, six, and even seven seeds. It is a native of both the Indies, &c.

Culture.—This plant is increased from seeds, which should be sown in the spring on a hot-bed, and when the plants are come up, each planted in a separate small pot filled with light rich earth, plunging them into a hot-bed of tanner's bark to bring them forward, watering and shading them until they have taken root; and as the earth in the pots becomes dry, they must be watered from time to time, and have air given in proportion to the warmth of the season, and the bed in which they are placed: when the pots in which they are planted are filled with their roots, the plants should be shifted into pots of a larger size, which must be filled up with rich light earth, and again plunged into the hot-bed, giving them air as before, according to the warmth of the season; but in very hot weather the glasses should be shaded with mats in the heat of the day, otherwise the sun will be too violent for them through the glasses; nor will the plants thrive if they are exposed to the open air, even

in the warmest season; so that they must be constantly kept in the bark-stove both summer and winter, treating them in the same manner as the Coffee-tree. These plants have a good effect in the stove collections.

TAMARIX, a genus furnishing plants of the hardy, deciduous, tree, and shrub kinds.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a five-parted perianth, obtuse, erect, permanent, shorter by half than the corolla: the corolla has five petals, ovate, concave, obtuse, spreading: the stamens have five capillary filaments: anthers roundish: the pistillum is an acuminate germ: style none: stigmas three, oblong, revolute, feathered: the pericarpium is an oblong capsule, acuminate, three-sided, longer than the calyx, one-celled, three-valved: the seeds very many, very small, papose.

The species cultivated are: 1. *T. Gallica*, French Tamarisk; 2. *T. Germanica*, German Tamarisk.

The first in its native situation grows to a tree of middling size, but in this climate seldom more than fourteen or sixteen feet high: the bark is rough, and of a dark brown colour: it sends out many slender branches, most of which spread out flat and hang downward at their ends; these are covered with a chesnut-coloured bark, and garnished with very narrow finely divided leaves, which are smooth, of a bright green colour, and have small leaves or indentures which lie over each other like scales of fish: the flowers are produced in taper spikes at the end of the branches, several of them growing on the same branch: the spikes are about an inch long, and as thick as a large earth-worm: the flowers are set very close all round the spike, are very small, and have five concave petals of a pale flesh colour, with five slender stamina terminated by roundish red anthers: they appear in July. It is a native of the South of France, &c.

The second species is rather a shrub than a tree, having several woody stalks arising from the same root, which grow quite erect, sending out many side branches which are also erect; they have a pale-green bark when young, afterwards changing to a yellowish colour: the leaves are shorter, and set closer together than those of the first sort, and are of a lighter green, approaching to a gray: the flowers are produced in long loose spikes at the end of the branches, standing erect, and are larger than those of the first. It is a native of Germany, &c.

Culture.—These plants may be increased either by laying down their tender shoots in

T A M

autumn, or by planting cuttings in an east border, which will take root in a short time, if they are supplied with water in the spring, before they begin to shoot in dry weather; but they should not be removed until the following autumn, at which time they may be either placed in a nursery to be trained up two or three years, or where they are designed to remain, mulching their roots, and watering them according as the season requires, until they have taken root; after which, the only culture they will require, is to prune off the straggling shoots, and keep the ground clean about them.

The layer method is not only tedious but unnecessary, as the cuttings grow readily, and the layers often will not strike at all. The cuttings should be of the last summer's shoots, and a moist border is most proper for them. In two years they will be good plants for the shrubbery, and may be planted out in almost any soil, though they like a light moist earth best, especially the latter sort, which grows naturally in low watery situations.

They are very ornamental in the shrubbery borders, clumps, and other parts of grounds.

TAMUS, a genus furnishing plants of the hardy herbaceous climbing perennial kind.

It belongs to the class and order *Dioecia Hexandria*, and ranks in the natural order of *Sarmentaceae*.

The characters are: that in the male, the calyx is a six-parted perianth: leaflets ovate-lanceolate, spreading more at top: there is no corolla: the stamina have six simple filaments, shorter than the calyx: anthers erect: female—calyx a one-leafed perianth, six-parted, bell-shaped, spreading: segments lanceolate, superior, deciduous: the corolla petals none: nectaries an oblong point, fastened internally to each calycine segment at the base: the pistillum is an ovate-oblong germ, large, smooth, inferior: style cylindrical, length of the calyx: stigmas three, reflexed, emarginate, acute: the pericarpium is an ovate berry, three-celled: the seeds two, globular.

The species are: 1. *T. Communis*, Common Black Bryony; 2. *T. cretica*, Cretan Black Bryony.

The first has a very large tuberous root, blackish externally, whence its old Latin and English names: the stems smooth, twining about every thing in their way, and thus ascending, without the aid of tendrils, to the height of ten or twelve feet in hedges or among bushes, which their festoons of tawny leaves and red berries decorate in autumn: the leaves alternate, petioled, smooth and shining, quite entire; the nerves raised beneath, varying from kidney- to

T A N

heart-shaped, heart-spear-shaped, triangular spear-shaped, and even halbert-shaped: the flowers greenish, in long racemes or bunches from the side of the stalks, appearing in June; the barren and fertile ones on separate roots. It is a native of Europe.

The second species has a rounder root than the other; the stalks twine in the same manner; but the principal difference consists in the leaves being divided into three lobes. It was discovered in the island of Crete or Candia.

Culture.—These plants are readily increased by sowing the seeds soon after they are ripe under the shelter of bushes, where, in the spring, the plants will come up, and require no further care; or in beds to be afterwards planted out. The roots will abide many years, and sometimes send up suckers, from which plants may be raised by setting them out in the autumn or spring where they are to remain.

They are useful in thickets and wilderness parts. TAN. See BARK.

TANACETUM, a genus furnishing plants of the herbaceous and shrubby perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositae Discoideae*.

The characters are: that the calyx is common hemispherical, imbricate: scales acute, compact: the corolla compound tubular, convex: corollets hermaphrodite numerous, tubular, in the disk; females some in the ray: proper of the hermaphrodite funnel-form; with a five-cleft reflexed border: female trifid, more deeply divided inwardly: the stamina in the hermaphrodites: filaments five, capillary very short: anther cylindric, tubular: the pistillum in the hermaphrodites germ oblong, small: style filiform, length of the stamens: stigma bifid, revolute; in the females germ oblong: style simple: stigmas two, reflexed: there is no pericarpium: calyx unchanged: the seeds solitary, oblong: down slightly margined: the receptacle convex, naked.

The species cultivated are: 1. *T. vulgare*, Common Tansy; 2. *T. annuum*, Annual Tansy; 3. *T. Balsamita*, Cost-mary; 4. *T. Sibiricum*, Siberian Tansy; 5. *T. suffruticosum*, Shrubby Tansy; 6. *T. flabelliforme*, Fan-leaved Tansy.

The first has a fibrous creeping root, which will spread to a great distance: the herb is bitter, and has a strong aromatic smell: the stems upright, two feet high, (in a garden from two to almost four feet,) leafy, round, striated, scarcely hairy: the leaves alternate, deep green, acutely cut, smooth, or somewhat hairy beneath, cared at the base, embracing: pinnules lanceolate deeply and acutely serrate: the flowers are in

terminating corymbs, of a golden colour and flatish. It is a native of Europe and Siberia, flowering from June to August.

There are varieties with curled leaves, called Double Tansy; with variegated leaves; and with larger leaves, which have little scent.

The second species is an annual plant, rising about two feet high: the stem stiff, but herbaceous, sending out many side branches their whole length; the lower ones four or five inches long, gradually shorter to the top: the leaves come out in small clusters from the joints; they are very narrow and short; some end in three points, others are single: the branches are terminated by clusters of flowers of a bright yellow; each corymb on a short peduncle. They appear in July or August, and continue till the frost destroys them. It has a fine aromatic scent, and is a native of Spain and Italy.

The third has a hardy root, fleshy and creeping: the lower leaves near three inches long, and an inch and half broad, of a grayish colour, and on long footstalks: the stems rise from two to three feet high, and send out branches from the side: the leaves on these are like the lower ones, but smaller and sessile: the flowers are produced at the top of the stems in a loose corymb; they are naked, and of a deep yellow colour, appearing in August. The whole plant has a soft pleasant odour. It is a native of the South of France, Spain, and Italy.

The fourth species has the leaves linear, pinnate: pinnae linear, filiform, often bifid or trifid, quite entire: the corymb terminating and others axillary, few-flowered; flowers yellow: the root is fibrous perennial: the stalks more than two feet high. It flowers in June and July, and is a native of Siberia.

The fifth species rises with a branching shrubby stalk, three or four feet high: the segments of the leaves are very narrow, and frequently cut into acute segments: the flowers are produced in small roundish bunches, at the ends of the branches, of a bright yellow, and appear in August. It is a native of the Cape.

The sixth species has all the florets hermaphrodite and five-cleft: the receptacle naked, not chaffy. It is a native of the Cape, flowering from May to August.

Culture.—The different herbaceous species are increased by parting the roots, and by seed.

In the first mode the business is effected by slipping or dividing the roots in autumn or winter, when the stalks are decayed; or early in spring, before new stalks shoot forth, planting the slips at once where they are to remain; those for the kitchen-garden, as the Common Tansy, &c. in any bed or border a foot and a half

asunder; and those intended for variety in the pleasure-ground, singly here and there, at suitable distances, to effect a proper diversity.

The seed sowed in autumn should be sown in the spring following, in beds of light earth, broad-cast and raked in, when the plants will soon come up, and in July be fit to prick out in beds, in rows a foot asunder; some to remain, and others to be planted out in autumn where they are to grow.

The shrubby sorts are easily increased by cuttings of the branches, which should be planted any time in spring and summer, choosing the young and most robust shoots, which should be cut off in proper lengths; and if early in spring, &c. be planted in pots of good earth, several in each, plunging them in a hot-bed, where they will be rooted, and fit for potting off separately in six weeks; or, if in summer, the young shoots may be planted in the full ground, in a shady border, or where they may be shaded with mats from the sun; or in pots, and placed in the shade, or under a garden frame, &c.; in all of which methods, giving plenty of water, they will readily take root; but those in the hot-bed will be forwardest: they however will all be well rooted the same season, and should then be transplanted in separate pots, and managed as other shrubby green-house plants. See GREEN-HOUSE PLANTS.

The former sorts require to be afterwards kept free from weeds, cutting down the decayed stalks annually in autumn; and as the roots increase fast into large bunches, spreading widely round, they should be cut in, or be slipped occasionally, otherwise they are apt to overrun the ground; and to have the ground dug between the plants annually.

The latter sorts are somewhat tender, but only require shelter from frost, being kept in pots, and deposited among the green-house plants, and treated as other shrubby exotics of that collection. They effect a very agreeable variety at all times of the year, but particularly in summer and autumn, when in flower.

TARCHONANTHUS, a genus containing a plant of the shrubby evergreen exotic kind.

It belongs to the class and order *Syngenesia Polygamia Aequalis*, and ranks in the natural order of *Nucamentaceæ*.

The characters are: that the calyx is common turbinate, one-leaved, commonly half-seven-cleft, coloured internally, shorter than the corolla, sharpish, permanent: the corolla compound uniform: florets about twenty: corollets hermaphrodite, numerous, equal: proper one-petalled, funnel-form, five-toothed: the stamina have five filaments, capillary, very

short: anther cylindric, tubular, length of the corollet, tailed at the base: the pistillum is a superior germ, oblong: style twice as long as the flower: stignias two, gaping: there is no pericarpium: calyx unchanged: the seeds solitary, oblong: down hairy, investing the seed all round: the receptacle hairy, very small, hairs length of the calyx.

The species cultivated is *T. camphoratus*, Shrubby African Fleabane.

It has a strong woody stem, rising to the height of twelve or fourteen feet, sending out many woody branches at the top, which may be trained to a regular head: the leaves are in shape like those of the Broad leaved Sallow, having a downy surface like Sage, and their under sides white; in smell they resemble Rosemary leaves when bruised: the flowers are produced in spikes at the extremity of the shoots, but, being of a dull purple colour, do not make much show: they appear in autumn, and continue great part of the winter. It retains its leaves all the year, and is a native of the Cape.

Culture.—This plant may be increased by cuttings, which should be planted out in the spring or early summer seasons in pots filled with light mould, giving them shade and water occasionally. They soon strike root, and in three or four months may be potted off into separate pots, affording them shade and water as before, and placing them under shelter. They also strike root in the summer season when planted in a common border and covered with hand-glasses, and may in these cases be potted off in the autumn.

They afterwards require the management of other hardy green-house plants.

They afford variety in these situations.

TARRAGON. See ARTEMISIA.

TAXUS, a genus furnishing a plant of the hardy evergreen tree kind.

It belongs to the class and order *Dioecia Monadelphica*, and ranks in the natural order of *Coniferae*.

The characters are: that in the male there is no calyx, except a bud like a four-leaved perianth: corolla none: the stamina have numerous filaments, united at bottom into a column, longer than the bud: anthers depressed, blunt at the edge, eight-cleft, gaping every way at the base, and, when they have discharged their pollen, flat, peltate, and remarkable for their eight-cleft margin: female—the calyx as in the male: corolla none: the pistillum is an ovate-acuminate germ: style none: stigma obtuse: the pericarpium is a berry from the receptacle, elongated into a præputium globular, succulent, gap-

ing at the top, coloured, at length wasting from dryness, and evanescent: the seed one, ovate-oblong, prominent at the top, beyond the berry.

The species cultivated is *T. baccata*, Common Yew-tree.

It has a straight trunk, with a smooth deciduous bark: the wood very hard, tough, and of a fine grain: the leaves thickly set, linear, smooth, evergreen: the flowers axillary, enveloped with imbricate bractes: the male on one tree, sulphur-coloured, without a calyx: the female on another, with a small green calyx, sustaining the oval flattish seed; which calyx at length becomes red, soft, and full of a sweet slimy pulp. It is a native of Europe, North America, &c.

It varies with very short leaves, with broad shining leaves, and with striped or variegated leaves.

Culture.—In this tree the increase may be effected by seeds, and sometimes by layers and cuttings.

After having procured a quantity of the Yew berries, and divested them of the pulp or mucilage, they should be sown in beds of light earth, either in shallow drills, or scattered over the surface, in the autumn or spring season (but the former is the best method, as the plants rise in the following spring), and be covered near an inch deep with light mould, out of the alleys, &c. They require no further care, only to keep the beds clean from weeds before and after the plants come up, and to give occasional waterings in dry weather, in spring and summer, to forward and strengthen the plants in their growth. They should have two years' growth in the seed-bed; then in the autumn or spring be planted out upon four-foot-wide beds, in nursery-rows, a foot asunder, to remain two, three, or four years, when some may be planted out finally for hedges, where required; others in the nursery quarters, in rows, two or three feet asunder, to be trained in a suitable manner for the purposes they are intended.

After growing in the nursery till they obtain from half a yard to four or five feet stature, they may be finally planted out in autumn or spring, for their intended purposes; when they will rise with a large spread of roots. They should be planted in their places as soon after removal as possible, giving each plant a good watering at the time.

In the future culture, those trained in hedges, &c. must be clipped annually, once or twice in the summer; and those in the shrubberies and rural plantations have the lower branches pruned up occasionally to a single stem; but the head

should generally be permitted to spread agreeably to its natural mode of growth, except just reducing any considerable rambling branch, &c.

The Striped or Variegated Yews, and other varieties, should be increased by layers or cuttings, as they are rarely permanent by seeds.

The layers should be made from the young shoots of not more than a year or two old, being laid down in spring, summer, or early in autumn, when many of them will take root, and in one or two years be fit for planting off into nursery-rows.

The cuttings should be made by cutting or slipping off a quantity of the one-year's shoots, divesting them of the lower leaves, and planting them in a shady border thick together, in small trenches, in the early spring or autumn, giving water at planting, and afterwards occasionally in dry hot weather. They will be well rooted in two years, and fit for being planted out into wide nursery-rows.

These plants may be employed as ornamental evergreens and as forest-trees; and they were formerly much used in hedges and trained figures: they have a good effect in shrubberies among others of the evergreen tribe, being permitted to assume their natural growth, in common with other trees and shrubs; and when planted as detached standards, in extensive distant opens of grass-ground, in parks, and the sides of hills, &c. likewise when introduced as forest-trees in timber plantations of the evergreen-kind. See PLANTATION.

For hedge-work, where internal hedges are required, either for ornament or shelter, no tree is better calculated, from its forming the closest, even, moderate-growing hedge of any tree of the evergreen collection. It is also calculated for training into formal or fancy figures, both in hedge-work and as detached objects, from its branches and leaves growing exceedingly close, and shooting very moderately and with regularity.

For these purposes the trees should be trained in their minor growth in the nursery; if for hedges or any fancy figures, by suffering the plants to branch away immediately from the very bottom, and cutting them with garden shears once or twice every summer; and if for the shrubbery or other rural plantations, by pruning them up a little at bottom to a single stem, and suffering the heads to branch out on all sides and at top diffusively; likewise, if for larger detached standards, by trimming up the stems gradually to elevate them in proportion, and encourage the heads to branch out, and spread widely.

TELEPHIUM, a genus furnishing a plant of the small hardy perennial kind.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Portulacaceæ*.

The characters are: that the calyx is a five-leaved perianth: leaflets oblong, obtuse, concave, keeled, length of the corolla, permanent: the corolla has five petals, oblong, obtuse, narrower below, erect, inserted into the receptacle; the stamina have five awl-shaped filaments, shorter than the corolla: anthers incumbent: the pistillum has a three-sided acute germ: style none: stigmas three, acute, spreading: the pericarpium is a short capsule, three-sided, three-valved, one-celled: the receptacle free, shorter by half than the capsule: seeds very many, roundish.

The species cultivated is *T. Imperati*, True Orpine.

It has a root composed of yellowish woody fibres, spreading out wide: the stalks and branches are slender, trailing, eight or nine inches long: the leaves small, ovate, grayish, smooth and pretty stiff, having one longitudinal nerve running through the middle: the flowers terminating, in short thick bunches, or corymbs, reflexed, of a white colour. It is a native of the South of France, Spain, &c. flowering from June to August.

Culture.—This plant is increased by sowing the seeds in the autumn or spring, in dry light mould, either where the plants are to remain, or in beds to be afterwards planted out. They appear in the spring, when they should be kept clear from weeds, and they will flower the following year.

It is also capable of being increased sometimes by offsets, slips, or cuttings, planted out in the spring season.

The plants afford variety in the common borders and clumps.

TEA-BUCKTHORN. See RHAMNUS.

TEA, NEW JERSEY. See CEANOTHUS.

TEA, NEW ZEALAND. See PHILADELPHUS.

TEA, OSWEGO. See MONARDA.

TEA TREE. See THEA.

TEA, WEST INDIAN. See SIDA.

TERRACE, a sort of raised bank of earth, &c. regularly formed in an oblong manner to any length, broad enough to admit of a spacious level walk at top, and elevated considerably above the level of the general surface; having the sides uniformly sloped; and laid with grass, and the top formed into a flat or level, sufficiently broad for a grass or gravel walk, of pro-

portionable width; designed in gardens as a high, airy walk, to command a better prospect of the adjacent places around, within and without the garden occasionally, as well as to enjoy the fresh air in summer more freely. In the former style of laying out gardens, it was considered as very ornamental, but is at present much in disuse.

The height of a Terrace-walk may be more or less as the situation admits, as from one foot to one or two yards; or even three or four yards or more in particular situations, and where there are plenty of earthy materials, rubbish, &c. to form it, allowing breadth in proportion, from five to ten or twenty feet or more, and extended to any length required. They are sometimes formed on some naturally high, rising ground, to save as much trouble as possible, in bringing stuff from a distance; and sometimes raised wholly of forced materials.

The situation for a Terrace may be varied as the natural situation of the place may require.

In respect to form, they should always be broader at the base than the top, and extend lengthways to any distance required; having the sides regularly sloped, of more or less acclivity, as the width, height, and situation admit. Sometimes both sides are sloped, and sometimes only one side, the other perpendicular, and faced with a substantial wall, &c. or formed against the side of a hill, or some naturally rising ground; being finished always broad enough at top to admit of a proper walk. In some naturally-elevated situations, Terraces are sometimes formed one above another in two or more ranges, each having its separate side slopes, and elevated walk; in all of which the slopes are to be neatly laid with grass, and the walk at top occasionally of grass or gravel.

The entrances leading to Terrace-walks were formerly sometimes formed by an easy acclivity of a grass or gravelled slope, and sometimes by a grand flight of stone steps.

Where a rising ground, of considerable elevation, naturally presents itself in a proper situation, it is an eligible opportunity for forming a Terrace with the least expense and trouble, on account of its not requiring the addition of so much earth and rubbish as when raised entirely on a perfect level, wholly of made earth.

Where there are any excavations of ground intended to form ha-has, pieces of water, &c. the excavated earth may be employed in forming Terraces, &c.

In the forming of a Terrace, the base must be staked out wider than the intended width at top for the walk, in order to admit of the ascent of slopes being moderate. And the whole of

the made earth and rubbish must be well rammed and rolled down from time to time as it is applied, in order to render the whole equally firm, that it may not settle irregularly after being finished. The slopes may either be laid with turf, or sown with grass-seeds; but the first is much the best method where it can be employed. See GRASS-GROUND.

TETRAGONIA, a genus containing plants of the shrubby and herbaceous succulent perennial kinds.

It belongs to the class and order *Icosandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a four-leaved perianth, superior: leaflets four, ovate, bent down and flat, rolled back at the edge, coloured, permanent: there is no corolla, unless the calyx be called so: the stamina have twenty filaments, capillary, shorter than the calyx: anthers oblong, incumbent: the pistillum is a roundish germ, five-cornered, inferior: styles four, awl-shaped, recurved, length of the stamens: stigma longitudinal of the style, pubescent: the pericarpium is a coriaceous drupe, four-cornered with four longitudinal wings; the opposite angles narrower, not opening: the seed one, bony, four-celled: kernels oblong.

The species cultivated are: 1. *T. fruticosa*, Shrubby Tetragonia; 2. *T. decumbens*, Trailing Tetragonia; 3. *T. herbacea*, Herbaceous Tetragonia; 4. *T. echinata*, Hedge-hog Tetragonia.

The first has slender woody stems, rising three or four feet high if supported, otherwise trailing, covered with a light gray bark, and dividing into a great number of trailing branches, which when young are succulent, of an herbaceous colour, and covered with small pellucid drops, which reflect the light, somewhat like the Diamond Ficoides: as the branches grow older, they become more woody: the leaves are narrow, thick, succulent, about half an inch long, and a tenth of an inch broad, concave and blunt-pointed; they are placed alternately, and at their base comes out a cluster of smaller leaves, which have the like pellucid drops with the stalks: the flowers axillary, at every joint towards the ends of the branches, solitary, or two or three together. The fruit is an inferior juiceless drupe.

The second species has larger stalks than the preceding, but they branch out in like manner: the branches trail upon the ground; the young branches are very succulent, and almost as thick as a man's little finger: the leaves are two inches long, and an inch broad; their surface covered with very small pellucid drops, as are also the young branches: flowers larger, upon pretty

long footstalks, three or four from the same point: the calyx and anthers are of a pale sulphur colour. It flowers from July to September.

The third has large fleshy roots: the branches weak and trailing, generally decaying about midsummer, and new shoots produced late in autumn: the leaves come out in bunches; they are oval, plane, and not so thick and succulent as in the other sorts; they are little more than an inch long, and half an inch broad: the flowers are produced from the wings of the leaves in February; they are like those of the second sort, and have long slender footstalks. It flowers in June and July.

The fourth species has a biennial root: the stem herbaceous, near the root dividing into diffused branches, rendered angular by the petioles running down them, scarcely a foot long: the leaves succulent, spreading, an inch in length: petioles shorter by half than the leaves: the peduncles axillary, solitary, filiform, covered with shining bladders, purple, very short: the flowers pendulous, appearing as if frosted with crystalline bladders. It flowers from May to August.

They are all natives of the Cape.

Culture.—The first and fourth sorts may be increased by cuttings, which should be cut off from the plants a few days before they are planted, that the part where they are cut may be healed, setting them out in July, that they may have time to make good roots before winter, on a bed of fresh earth, shading them from the sun in the heat of the day. They should afterwards be frequently refreshed with water in small quantities. In a few weeks, when well rooted, they should be taken up, and planted into pots filled with light fresh undunged earth, and placed in a shady situation until they have taken new root, after which they may be placed with other hardy exotic plants in a sheltered situation, where they may remain till the middle or latter end of October; at which time they should be removed into the green-house, and placed where they may enjoy as much free air as possible in mild weather, as they only require to be protected from the frost, being pretty hardy with respect to cold. As when planted in the full ground in the summer season they are apt to grow rank and large, or even when permitted to root into the ground through the holes at the bottom of the pots, the pots should be frequently removed to prevent it, as they are injured by it.

The first and second sorts are likewise capable of being raised by seeds, sown in a gentle hot-bed or in a warm border of light fresh earth, in

the spring. When the plants are about four inches high, they may be planted out in pots, treating them in the same manner as the cuttings.

And the third sort will grow from cuttings planted early in the spring, in the same manner as the others.

They afford ornament among other potted plants.

TEUCRIUM, a genus furnishing plants of the under-shrubby and herbaceous kinds.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillate*.

The characters are: that the calyx is a one-leaved perianth, half-five-cleft, acute, almost equal, gibbous at the base on one side, permanent: the corolla one-petalled, ringent: tube cylindric, short, ending in an incurved throat: upper lip erect, acute, deeply two-parted beyond the base; the segments at the sides distant: lower lip spreading, tritid: the lateral segments of the same form with the upper lip, almost erect; the middle one very large, and somewhat rounded: the stamens have four awl-shaped filaments, longer than the upper lip of the corolla and ascending in the cleft of it, prominent: anthers small: the pistillum is a four-parted germ: style filiform, situation and size of the stamens: stigmas two, slender: there is no pericarpium: calyx unchanged, fostering the seeds at the bottom: the seeds four, roundish.

The species cultivated are: 1. *T. flavum*, Yellow-flowered Shrubby Germander; 2. *T. Scorodonia*, Sage-leaved Germander, or Wood Sage; 3. *T. Canadense*, Nettle-leaved Germander; 4. *T. montanum*, Dwarf Mountain Germander; 5. *T. Pyrenaicum*, Pyrenean Germander; 6. *T. Polium*, Poley; 7. *T. capitatum*, Round-headed Germander; 8. *T. pumilum*, Dwarf Germander; 9. *T. fruticosum*, Narrow-leaved Tree Germander; 10. *T. latifolium*, Broad-leaved Tree Germander; 11. *T. Creticum*, Cretan Germander; 12. *T. Marum*, Common Marum or Cat-thyme.

The first has a shrubby, branched, pubescent stem, often procumbent at the base: leaves ovate, shining above, pubescent beneath, crenate, obtuse, petioled; the upper ones quite entire; the whorls from two to six-flowered, distinct: the flowers pedicelled. According to Miller, they are of a dirty white colour, and appear in July. It is a native of the South of Europe, &c.

There is a variety, which is hairy, with yellow flowers, with pale white flowers, and with purple flowers.

The second species has a perennial creeping root: the stems a foot and half or two feet high, four-cornered, nearly upright, hairy, leafy, hard,

often purple; panicle racemed: leaves opposite, wrinkled, hairy, veiny, and wrinkled like Sage, somewhat glutinous, strong-smelling, bitter: the flowers are in pairs, on long opposite naked racemes, pedicelled. It is a native of Europe and Morocco, flowering from July to September. It is used sometimes as hops in beer.

The third is a perennial plant, very like the second, but does not creep at the root as that does: the stalks are erect: the leaves are white on their under side, and deeply serrate: the flowers yellow in terminating racemes. It is observed by Marshall, that the plant from Canada has narrower leaves, equally serrate, tomentose beneath, flat: the spike is composed of whorls or scattered flowers, with a very small bracte under each. But the garden plant has larger wrinkled leaves, unequally serrate, scarcely pubescent beneath; and flowers in a subspiked raceme, of six-flowered, six-leaved whorls, with serrate bractes. It is a native of North America, flowering in August and September.

The fourth species, according to Miller, has the root composed of many woody fibres, which spread wide; hence arise several weak, trailing, woody stalks, eight or nine inches long, sending out many branches: the leaves are small, of a deep green: the flowers white, appearing in June and July; but seldom succeeded by seeds in this climate. It is a native of Germany.

There is a variety with much smaller leaves, hoary on their under side.

The fifth has slender shrubby stalks, which trail close upon the ground; they have a purple bark, and are covered with white hairs: the leaves are round at the top, but at their base are contracted in form of a wedge, so as to resemble at first sight the leaves of Ground-ivy, but they are hairy, and of a thicker consistence: the flowers are collected in round bunches at the end of the branches: the corolla is large; and one half of it is purple, the other white. It flowers great part of the summer, but seldom produces seeds in this climate. It grows naturally on the Pyrenean mountains.

The sixth species has the stems suffruticose, round, procumbent: the whole plant tomentose and hoary: the leaves are oblong, lanceolate or almost linear: the flowers sessile, close and lying over each other, small: bractes the length of the calyx: corolla yellow: the middle segment concave, entire. It is a native of the South of Europe, the Levant, &c.

There are several varieties: as Common Yellow Poley, which has the stalks rather herbaceous and trailing, about six inches long and hoary: leaves woolly, about half an inch long, some wedge-shaped; others oblong, ending in obtuse

points, and crenate towards their ends: the flowers collected in oblong thick spikes at the end of the branches, of a deep yellow colour, and appearing at the beginning of June. This grows naturally in Spain.

The Narrow-leaved Yellow Poley, which has woody stalks, erect, branching, and covered with a hoary down, rising six or eight inches high: the leaves linear, woolly, about half an inch long, having sometimes two or three slight indentures on their edges: the flowers collected in roundish spikes at the end of the branches; they are bright yellow, have woolly calyxes, and appear in June and July. It grows naturally in Spain and Portugal.

The White Poley, which has the stems a foot long and trailing: the leaves are a little cottony, entire on the sides, but toothed at the end: the flowers are pretty large, white tinged a little with purple. It is a native of the South of France. There is also the Purple Poley.

The seventh is shrubby, branched at the base: the branches round, tomentose, erect: the leaves sessile, linear-lanceolate, obtuse, often ternate: the flowers corymbed, headed, close: calyxes villose-tomentose: the corolla small, pale yellow or white. It has the habit of *Origanum Majorana*, but is tomentose, and has narrow leaves. It is a native of France, &c.

There is a variety which has an erect branching stalk, which rises a foot high; the lower part becomes woody, but the upper is herbaceous: the leaves are linear-lanceolate, about an inch long, crenate, of a pretty thick consistence, and a little woolly: the flowers collected in a corymb at the end of the branches, white, appearing in July and August.

The eighth species has liginous procumbent slender downy stems, lying on the ground: the leaves in clusters; the flowers reddish, collected into small heads at the ends of the branches; coming out in June and July. It is a native of Spain.

The ninth has a shrubby branching stalk, rising six or eight feet high, and covered with a hoary bark: the leaves opposite, ovate, sessile or on very short petioles, near an inch long, and half an inch broad, smooth and of a shining green above, and hoary beneath: the flowers are axillary from the upper part of the branches, one on each side at a joint, on short peduncles. A native of Spain, &c., flowering in February.

There is a variety which is a little more branched, and has smaller shorter leaves: the flowers are paler, the stamens somewhat longer, the anthers smaller and brown, whereas in the larger sort they are violet: and another with variegated leaves.

The tenth species is a shrubby plant, growing seven or eight feet high, and may be trained to a much greater height: the flowers are somewhat shorter and smaller, though the leaves are larger; they are not blue but purplish, with more conspicuous veins and streaks; the anthers are of a dusky greenish colour; the leaves are broader, of a rhomboid form, more hairy, and whiter on their under side. It is a native of Spain, flowering from June to September.

The eleventh has the leaves acuminate, white beneath: the flowers in threes, or solitary: the calyxes are spiny. It is a native of Candia and Egypt.

The twelfth species has a low shrubby stalk, sending out many slender woody branches, in warm countries rising three or four feet high, but in England rarely half that height: the stalks are very hoary, and have small leaves placed opposite at each joint, about the size of those of Thyme, and pointed at both ends, green above, hoary underneath, having a grateful scent, but so piercing as to cause sneezing: the flowers grow in loose whorled spikes at the ends of the branches; they are very downy, and of a bright red colour; appear in July and August, but produce no seeds in this climate. It is a native of Spain.

Culture.—All the herbaceous and ligneous kinds may be readily increased by parting the roots, by slips of the young branches, and seeds: the roots may be divided in the autumn, or early spring, and the slips of the branches be taken off in the spring and summer, being planted out in moist shady situations; and when well rooted, they may be removed to where they are to remain, though it is best to plant them at once where they are to grow: the seeds may be sown in a bed or border of common earth in the early spring season.

In the *Polium* kinds the seeds should be sown in a bed of light earth, and the plants be either put out in nursery-rows, or set where they are to remain, in the latter end of summer.

The shrubby sorts may likewise be increased by slips or cuttings of the young shoots of the branches, which should be planted in pots filled with light mould, in the spring and summer months, in order to be removed under the protection of the green-house in winter, being afterwards managed as other green-house exotics.

The first sorts afford variety in the borders, &c., and the latter in assemblage with green-house plants.

THALICTRUM, a genus containing plants of the hardy, herbaceous, fibrous-rooted, perennial kinds.

It belongs to the class and order *Polyandria*

Polygynia, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx, unless the corolla be taken for it: the corolla has four petals, roundish, obtuse, concave, caducous: the stamina have very many filaments, wider at top, compressed, longer than the corolla: anthers oblong, erect: the pistillum, styles very many, very short: germs many, commonly pedicelled, roundish: styles none: stigmas thickish: there is no pericarpium: the seeds many, grooved, ovate, tailless.

The species cultivated are: 1. *T. tuberosum*, Tuberous-rooted Meadow Rue: 2. *T. Cornuti*, Canadian Meadow Rue: 3. *T. foetidum*, Fetid Meadow Rue: 4. *T. angustifolium*, Narrow-leaved Meadow Rue: 5. *T. lucidum*, Shining-leaved Meadow Rue: 6. *T. aquilegifolium*, Columbine-leaved Meadow Rue, or Feathered Columbine.

The first has knobbed roots: the leaves small, obtuse, indented in three parts at their points, of a grayish colour and smooth: the stalks rise a foot and half high, and are naked almost to the top, where they divide into two or three small ones, under each of which is placed one leaf; every division is terminated by a small bunch of pretty large flowers, disposed almost in form of an umbel, each composed of five white petals. It is a native of Spain, flowering in June.

The second species attains the height of three feet: the stems suffruticose, dark purple, branched: leaves resembling those of Columbine, but glaucous: the flowers in many pale-purple heads, five-petalled and white. It is a native of North America, flowering from May to July.

There is a variety, which is smaller, with pale purple filaments.

The third has the stem about six or seven inches high: the leaves downy, composed of a great number of small leaflets, which are bluntly indented, and have a fetid scent: the flowers in loose panicles, small, and of an herbaceous white colour: the leaves are somewhat hairy on both sides, pulpy and soft: the petals themselves are somewhat hairy, in the young plant reddish, but in the adult whitish, almost a foot high, and not very leafy. It is a native of the South of France, Switzerland, &c., flowering from May to July.

The fourth species has the stems from two to three feet high: the flowers small, collected in terminating panicles, and of an herbaceous white colour. It is a native of Germany and Switzerland, flowering in June and July.

The fifth has the stems upright, channelled, five or six feet high, having at each joint pinnate

THE

leaves, composed of many linear fleshy leaflets, which are for the most part entire, and end in acute points: the flowers are of a yellowish white colour; they appear in July, and are succeeded by small angular capsules, with one small oblong seed in each, which ripens in August. It is a native of France about Paris, and of Spain.

The sixth species has a thick fibrous root; the stems taper, rising three feet high: the leaves like those of Columbine: the flowers in large terminating panicles. It is a native of Scania, Switzerland, &c.

There are varieties with a green stalk and white stamens, and with a purple stalk and stamens. There are other sorts that may be cultivated for variety.

Culture.—All the sorts are readily increased by parting the roots, and planting them out in the autumn when the stems decay, or in the spring before the new ones are sent forth, in the strongest where they are to remain, and the weaker ones in nursery-rows for further growth: they may also be raised from seeds, which should be sown in a bed or border in the spring; when the plants rise, they should be kept clean, and be planted out where they are to remain, in the following autumn. They afford variety in the borders, and other parts of ornamented grounds.

THEA, a genus furnishing plants of the exotic shrubby kind.

It belongs to the class and order *Polyandria Monogynia*, (*Trigynia*), and ranks in the natural order of *Columniferae*.

The characters are: that the perianth is five-parted, very small, flat, inferior, permanent: segments roundish, obtuse, equal: the corolla has six petals, (three to nine) roundish, concave, large; of which two are exterior and a little smaller: the stamens have numerous filaments, (more than two hundred) filiform, shorter than the corolla, inserted into the receptacle: anthers cordate, fastened by the back: the pistillum is a globular-trigonal germ: styles three, united at the base, at bottom erect, closely approximating, and as it were united into one; above the stamens diverging, somewhat recurved at the top, after flowering separated to the very base, reflexed at the top: stigmas simple: the pericarpium is a trilocular capsule, trifolocular, gaping at the top, in three directions: the seeds solitary, globose, angular on the inward side.

The species is *Thea*, Tea-Tree.

It is commonly about the height of a man. It is described indeed by different authors, as varying much in size, from that just mentioned to thirty and even two hundred feet. Probably it may attain the height of thirty feet or more

THE

when left to itself; but in general the trees are cut down periodically, that they may make stronger shoots, and therefore are seldom seen to be above five or six feet high. The trunk is branching and round: the branches alternate or vague, suffish, inclining to an ash-colour, but reddish towards the end: the leaves alternate, elliptic, smooth, glossy, of a firm texture, bluntly serrate except near the base, blunt and for the most part slightly emarginate at the end, veined on the under side, on very short petioles, round and gibbous beneath, flatish and slightly channelled above: the stipules to the leaves none: peduncles axillary, alternate, single, curved, one-flowered, incrassate, having at the base a single stipule or bracte, which is awl-shaped, erect, elliptic, obtusely serrate, with the edges between the teeth recurved: the corolla white, varying in the number and size of the petals: the stamens, according to Loureiro, inserted rather into the base of the corolla than into the receptacle.

In respect to the varieties, Martyn has considered them all as forming one species, in which, he is, he says, supported by the best authorities. "Kämpfer," says he, "attributes their difference to soil, culture, age of the leaves, and method of curing them. Mr. Ellis directly asserts that the Green and Bohea Tea are one and the same species; and that it is the nature of the soil, the culture, and manner of gathering and drying the leaves, that makes the difference; and a Green Tea-tree planted in the Bohea country will produce Bohea Tea, and the contrary. So also Sir George Staunton says; every information received concerning the Tea plant concurred in affirming, that its qualities depended upon the soil in which it grew, and the age at which the leaves were plucked off the tree, as well as upon the management of them afterwards. Linnæus, it is well known, distinguished two species of *Thea*; the *Bohea* with six-petalled flowers, and the *Viridis* or Green with nine-petalled flowers: but it is now well ascertained that the number of petals is very uncertain; and Dr. Lettsom informs us that he has examined several hundred flowers both from the Bohea and Green countries, and that their botanical characters have always appeared uniform. In the catalogue of the royal botanic garden at Kew, two varieties of *Thea Bohea* are given, distinguished by the leaves; namely, *Laxa* or Broad-leaved Tea, with elliptic-oblong wrinkled leaves; and *Stricta*, or Narrow-leaved Tea, with lanceolate flat leaves. The Bohea Tea-trees now introduced into many botanic gardens near London, exhibit very obvious varieties: the leaves are of a deeper green colour, and not so deeply serrated; and the stalk is usually of a darker colour: but the botanical characters

are the same. Thunberg also distinguishes two varieties from the leaves, which in one are smaller, flat, darker green, with straight serratures, and in the other larger, waved, brighter green, with sinuate serratures: but they can scarcely be considered as distinct species. Loureiro observed little difference in the Sou-chong, which he examined: both these have a brown colour, but are more odoriferous and precious than the common Bohea of the province of Fo-kien, which he had not an opportunity of seeing in a living state, though it is the most common and cheapest of all. He examined the dry flowers of the Green tea, from the province of Kiang-si, and observed the same inconstancy, as to the number of parts in the calyx and corolla, as in the Bohea. Upon the whole he concludes that all the differences of Chinese tea form only one botanical species, owing their variation to soil, culture, and method of preparation; all retaining the same inconstancy in the parts of the flower, which gave occasion to Linnæus to consider them as two species."

It is added, "that many varieties of tea are known in China, from mixture and management." The distinctions chiefly regarded in Europe are the following.

"*Green Teas.*—1. Bing, Imperial or Bloom Tea, with a large loose leaf, of a light green colour, and a faint delicate smell.

"2. Hy-tiann, Hikiong, Hayssuen or Heechun, known to us by the name of Hyson Tea: the leaves are closely curled and small, of a green colour verging towards blue. Another Hyson Tea, with narrow short leaves, is called Hyson-utchin. There is also a green tea named Gôbû, with long narrow leaves.

"3. Song-lo or Singlo, which name it receives, like several others, from the place where it is cultivated."

"*Bohea Teas.*—1. Soo-chuen, Sut-chong, Sou-chong, or Su-chong, called by the Chinese Saa-tyang, and Sact-chaon or Sy-tyann, is a superior kind of Cong-fou Tea. It imparts a yellowish green colour by infusion, and has its name from a place or province in China. Padre Sutchong has a finer taste and smell: the leaves are large and yellowish, not rolled up, and packed in papers of half a pound each. It is generally conveyed by caravans into Russia; without much care it will be injured at sea. It is rarely to be met with in England.

"2. Cam-bo or Soum-lo, called after the name of the place where it is gathered: a fragrant tea with a violet smell; its infusion is pale.

"3. Cong-fou, Congo, or Bong-lo: this has a larger leaf than the following, and the infusion is a little deeper coloured. It resembles the common Bohea in the colour of the leaf.

"There is a sort called Lin-Kisam, with narrow rough leaves. It is seldom used alone, but mixed with other kinds. By adding it to Congo, the Chinese sometimes make a kind of Pekoe tea.

"4. Pekao, Pecko, or Pekoe, by the Chinese called Back-ho or Pack-ho. It is known by having the appearance of small white flowers intermixed with it.

"5. Common Bohea or Black Tea, called Moji or Mo-ee by the Chinese, consists of leaves of one colour. The best is named Tao-kyonn. An inferior kind is called Au-kai, from a place of that name. In the district of Honan, near Canton, the tea is very coarse, the leaves yellow or brownish, and the taste the least agreeable of any. By the Chinese it is named Honan-té, or Kuli-té.

"Besides these, Tea both Bohea and Green is sometimes imported in balls, from two ounces to the size of a nutmeg and of peas. The Chinese call it Poncul-tcha. The smallest in this form is well known under the name of Gunpowder Tea.

"Sometimes the succulent leaves are twisted like packthread, an inch and half or two inches long; three of these are usually tied together at the ends by different-coloured silk threads. Both Green and Bohea are prepared in this manner.

"The manner of gathering and preparing the leaves, as practised in Japan," according to Kämpfer, "as far as our information reaches, is in a great measure conformable to the method used by the Chinese.

"The leaves are gathered carefully one by one, and each person is able thus to collect from four to ten or fifteen pounds in one day. The first gathering commences about the end of our February, or beginning of March, when the leaves are young and tender: they are called Ficki Tsjaa or powdered tea, because they are pulverised and sipped in hot water: they are disposed of to princes and rich people only, and hence this kind is called Imperial Tea.

"A similar sort is called Udsi Tsjaa, and Tacke Sacki Tsjaa, from the places where it grows. Peculiar care and nicety is observed in gathering these leaves.

"The second collection is made at the end of March or beginning of April. This is called Toot-jaa, or Chinese Tea, because it is infused and drunk after the Chinese manner.

"The third gathering is made in June, when the leaves are full grown. This is called Bau Tsjaa; it is the coarsest, and is chiefly consumed by the lower class of people. By sorting these, several other varieties are produced.

"Whether the Chinese collect the tea precisely at the same seasons as in Japan, we are not well informed; but most probably the tea

harvest is nearly at the same periods, the natives having frequent intercourse, and their commercial concerns with each other being very extensive.

"The tea leaves should be dried as soon as possible after they are gathered. For this purpose public buildings are erected, containing from five to ten, and even twenty small furnaces about three feet high, each having at the top a large iron pan. There is also a long table covered with mats, on which the leaves are laid, and rolled by workmen who sit round it. The iron pan being heated to a certain degree by a fire made in the furnace beneath, a few pounds of the leaves are put upon the pan, and continually turned and shifted by the hands till they become too hot to be endured; they are then thrown upon the mats to be rolled between the palms of the hands; after which, they are cooled as speedily as possible. In order that all the moisture of the leaves may be completely dissipated, and their twisted form be better preserved, the above process is repeated several times with the same leaves, but less heat is employed than at first. The tea thus manufactured is afterwards sorted according to its kind or goodness. Some of the young tender leaves are never rolled, and are immersed in hot water before they are dried.

"Country people cure their leaves in earthen kettles, which answer every necessary purpose, at less trouble and expense, whereby they are enabled to sell them cheaper.

"After the tea has been kept for some months, it is taken out of the vessels in which it was stored, and dried again over a very gentle fire, that it may be deprived of any humidity which remained, or it might have since contracted.

"The common tea is kept in earthen pots with narrow mouths; but the best sort used by the emperor and nobility is put into porcelain or china vessels. The coarsest tea is kept by the country people in straw baskets, made in the shape of barrels, which they place under the roofs of their houses, near the hole that lets out the smoke."

Culture.—These plants may be raised in this country by seeds, layers and cuttings of the young branches. The editor of Miller's Dictionary advises that the seeds should be procured from China, and that care should "be taken that they be fresh, sound, ripe, white, plump, and moist internally. After being well dried in the sun, they may be inclosed in bees-wax, or, left in their capsules, they may be put into very close canisters of tin or tutenague. Thouin, in his directions to Proust, he says, recommends

VOL. II.

these and other seeds to be placed in alternate layers of earth or sand, in tin boxes, closed up exactly, and placed in solid cases, covered with waxed cloth; the boxes to be placed in a part of the ship the least accessible to moisture, and the most sheltered from extreme heat or cold." And "Mr. Sneyd," he adds, "was very successful in having seeds packed up in absorbent paper, and surrounded by raisins or moist sugar, which kept them in a state fit for vegetation. American seeds are frequently brought over, by putting them into a box, not made too close, upon alternate layers of moss, in such a manner as to admit the seeds to vegetate. This might be tried with the seeds of the Tea-tree; and to succeed more certainly, some of the seeds might be sown in pots or boxes, when the vessel arrives at St. Helena, and after passing the tropic of Cancer, near the latitude of thirty degrees north. But the best method" says he, "seems to be, to sow ripe seeds in good light earth in boxes, at leaving Canton; covering them with wire, to prevent rats and other vermin from coming to them; and taking care that the boxes be not exposed to too much air, nor to the spray of the sea. A little fresh or rain water should be sprinkled over them now and then; and when the seedling plants appear, they should be kept moist, and out of the burning sun. If young plants can be procured in China, they may be sent over in a growing state in boxes, forty inches long by twenty broad, and as much in depth, having a few holes bored through the bottom. When the trees arrive here they must be kept in a green-house during the winter, and in the open air during the summer; and if they come in bad condition, it may not be amiss to plunge the pots into which they are transplanted, in a gentle hot-bed, or to set them in the tan-pit, to make them strike and shoot more freely." It is further remarked, that "though the Tea-tree will not at present bear the rigour of our winters, in the open air, yet it is not impossible but it may gradually become naturalized to our climate, like the Magnolia, among several other trees and shrubs; especially if it were to be brought from the coldest provinces of China, where it grows, or from the parts of Europe a little to the southward of us, when it shall have been naturalized there." It is increased freely from cuttings, when managed in the same manner as Gardenias; and it also sometimes grows from layers laid down in the autumn or spring.

Some of these plants should be always kept in pots, to be removed under the shelter either of a green-house, glass case, or deep garden frame, in winter; and others be planted in a dry, well-

sheltered, warm, conspicuous part of the shrubbery, to afford occasional covering from rigorous frosts.

They afford variety in green-house collections, as well as in the shrubberies.

THEOBROMA, a genus containing a plant of the exotic tree kind.

It belongs to the class and order *Polyadelphia Decandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a five-leaved perianth: leaflets lanceolate, acute, spreading, deciduous: the corolla has five petals, smaller than the calyx: claws wide, arched, concave like a helmet, emarginate at the tip, scored internally with a thick triple line inserted into the nectary at the base: borders roundish, acuminate, spreading, each narrowed at the base into a small claw which is from upright recurved, and fastened into the claw: nectary a short little pitcher, putting forth five little horns, which are awl-shaped, long, erect, acuminate, bent in and converging, decurrent along the pitcher: the stamina have five filiform filaments, erect, bent outwards at top, lying within the claws of the petals, growing externally to the nectary, alternate with and shorter than the horns: anthers on each filament two, (one on each side at the tip,) vertical, one cell superior, the other inferior: the pistillum is an ovate germ: style filiform, (striated, Aubl.) a little longer than the stamens: stigma five-cleft: the pericarpium is an oblong capsule, coriaceous, unequal, five-cornered, five-celled, valveless, not opening: the seeds very many, subovate, nestling in a buttery pulp, fastened to a central columnar receptacle.

The species is *T. Cacao*, Chocolate Nut Tree.

It grows in a very handsome form to the height of twelve or sixteen feet: the trunk is upright, and about as high as a man before the head spreads out: the wood is light and of a white colour, and the bark is brownish and even: the leaves lanceolate-oblong, bright green, quite entire, alternate, from nine to sixteen inches long, and three or four inches wide at most, on a petiole an inch in length and thickened at both ends: the peduncles slender, about eight or ten together, chiefly from the scars of the fallen leaves: one of them only for the most part fruitful, the rest abortive: the flowers small, reddish, inodorous: fruit smooth, yellow, red, or of both colours, about three inches in diameter: rind fleshy, near half an inch in thickness, flesh-coloured within: pulp whitish, the consistence of butter, separating from the rind in a state of ripeness, and adhering to it

only by filaments, which penetrate it and reach to the seeds. Hence it is known when the seeds are ripe, by the rattling of the capsule when it is shaken: the pulp has a sweet and not unpleasant taste, with a slight acidity; it is sucked and eaten raw by the natives: it may be easily separated into as many parts as there are seeds, to which it adheres strongly, and they are wrapped up in it, so that each seed seems to have its own proper pulp: the seeds are about twenty-five in number: when fresh they are of a flesh-colour: gathered before they are ripe, they preserve them in sugar, and thus they are very grateful to the palate: they quickly lose their power of vegetation, if taken out of the capsule, but kept in it they preserve that power for a long time: the tree bears leaves, flowers, and fruit all the year through; but the usual seasons for gathering the fruit are June and December: in two years from the seed it is above three feet high, and spreads its branches, not more than five of which are suffered to remain: before its third year is complete it shows for fruit: a tree yields from two to three pounds of seeds annually. It is a native of South America.

Culture.—It is increased by seed obtained from abroad, sowing it as soon after its arrival as possible, in pots filled with light earth, and plunging them in a bark-bed, where they will soon come up; and when the plants are about three inches high, potting them off separately, and replunging them in the bark-bed in the stove, managing them as other woody exotics of the stove kind afterwards.

They afford an agreeable variety in stove collections.

THERMOMETER, an instrument constructed for the purpose of measuring the degrees of heat and cold at all seasons, and which is of great utility in the culture of tender exotic stove plants, by serving as a guide to regulate the proper degree of heat for the hot-houses containing such plants.

Their construction for this use consists of a long slender glass tube, or pipe, about eighteen inches or two feet long, having a small glass ball or globe at the lower end; and it is fixed longitudinally on a brass or wooden plate or frame, the same length, or longer, and four or five inches broad; the glass tube and ball being furnished with a quantity of coloured liquid spirit, or other fluid, which is affected by heat and cold so as to ascend higher or lower in the tube proportionably, a scale being marked on the frame along each side of the tube, divided into the different degrees of heat and cold: and the spirit ascending by the heat of the internal

air of the stove, promoted by fire, &c. points out on the scale the proper degree of heat required, having the name of some remarkable exotic, such as the ananas, or pine-apple, written on the scale as a standard mark of the requisite temperature of heat, so as when the internal heat of the stove raises the spirit to that mark, or within five degrees over or under, is the proper temperature for the growth of the ananas, and all other tender plants from the hottest parts of the world; so that the fires requisite for the stove in winter, are to be made stronger or weaker accordingly.

They are more particularly useful in winter, during the time the fires are made in the flues for warming the air internally; one being generally hung up toward the centre of the stove, so as the warmth may operate moderately and equally on every side, and discover the real temperature of the general internal heat, which should be supported always nearly equal by the aid of bark hot-heus and real fire, sufficient to raise the spirit or other fluid in the tube to the mark ananas, or but a little over or under it.

They should not only be suspended nearly towards the centre of the stove, but also out of the sun, that the glass tube and ball containing the spirit or other fluid may be shaded as much as possible; and also at some medium distance from the fire-place and flues, so as neither the direct rays of the sun, or heat of the fire, darting immediately on the tube and ball, may affect the operation of the inclosed fluid, and cause it to mount higher than would be effected by the real general warmth of the air of the stove, and thereby lead into an error, in supposing the internal heat to be much stronger than it really is, when probably it is not strong enough. See ANANAS.

THICKETS, a sort of close plantations of trees and shrubs, in pleasure-grounds, parks, &c. They are designed for different purposes, as sometimes to repel the force of tempestuous and cold cutting winds, either from the habitation, or some particular part of the garden; or to form places of shade or retirement in summer, having spaces for walks, recesses, &c. under the umbrage of the trees, and occasionally to conceal from view any unsightly or disagreeable object, and also sometimes to form a screen or blind arranged towards some outward boundary.

On some occasions, they are introduced in the internal parts of large pleasure-grounds, and parks, in contrast to the more open and airy plantations, in which to have shady wood-walks winding variously through them, also to form recesses, by environing particular spaces,

rendering them retired, shady, and sheltered, by the surrounding trees and shrubs composing the thickets: close thickets of hardy trees and shrubs are sometimes also disposed in detached clumps in capacious open situations, to effect a diversified ornamental variety, the clumps being distantly stationed so as not to obstruct the view of any desirable object.

They are sometimes planted wholly of the large tree kinds, five or six to eight or ten feet asunder, some in regular lines like a close grove, or more generally in a sort of promiscuous planting, but with some degree of order in the distances: they are also often composed of various trees and shrubs together to effect a more full, close growth below and above, and to display a greater diversity in the plantation, by disposing the various shrubs properly between the larger trees, in some order of gradation, the lowest towards the front, and the taller growths backward, so as to form a sort of close underwood thicket below, while the trees run up and form a thickety growth above: and sometimes they are formed wholly of shrubs of different sorts and degrees of growth, from the lowest placed forward to the tallest behind.

They are sometimes formed wholly of particular sorts of trees disposed separately in distinct plantations, as of elm, ash, beech, poplar, alder, willow, &c.

The planting of thicket plantations should be effected with young trees of from four, five or six, to eight or ten feet growth, and the shrub kinds proportionally; in all of which the planting may be performed in the common seasons of autumn, winter and spring.

In the culture of thicket plantations, little is required but that of keeping them clear from large overbearing weeds, while the trees and shrubs are in young small growth.

THISTLE, GLOBE. See ECHINOPS.
THISTLE, MELON. See CACTUS.
THISTLE, TORCH. See CACTUS.
THORN APPLE. See DATURA.
THORN, BOX. See LYCIUM.
THORN, CHRIST'S. See RHAMNUS.
THORN, COCKSPUR. See CRATÆGUS.
THORN, EGYPTIAN. See ACACIA.
THORN, EVERGREEN. See MESPILUS.
THORN, GLASTONBURY. See CRATÆGUS.
THORN, GOAT'S. See TRAGACANTHA.
THORN, HAW. See CRATÆGUS.
THORN, LILY. See CATESBÆA.
THORN, PURGING. See RHAMNUS.
THORN, WHITE. See CRATÆGUS.
THORNY TREFOIL. See FAGONIA.

THOROW-WAX. See **BOPLEURUM.**

THUJA, a genus containing a plant of the hardy evergreen tree kind.

It belongs to the class and order *Monœcia Monadelphica*, and ranks in the natural order of *Coniferæ*.

The characters are: that in the male flower the calyx is an ovate ament, composed of a common rachis, on which opposite flowers are placed in a triple opposition: each flower has for its base a subovate, concave, obtuse scale: there is no corolla: the stamina have four filaments (in each floret) scarcely manifest: anthers as many, fastened to the base of the calycine scale:—female flower on the same plant: the calyx is a common subovate strobile, surrounded with opposite florets; composed of two-flowered, ovate, convex scales, converging longitudinally: there is no corolla: the pistillum is a very small germ: style awl-shaped: stigma simple: the pericarpium is an ovate-oblong strobile, obtuse, opening longitudinally, with oblong scales, almost equal, convex outwardly, obtuse: the seeds oblong, girt longitudinally with a membranaceous wing, emarginate.

The species cultivated are: 1. *T. occidentalis*, American Arbor-vitæ; 2. *T. orientalis*, Chinese Arbor-vitæ.

The first has a strong woody trunk, which rises to the height of forty feet or more: the bark, while young, is smooth and of a dark brown colour, but as the trees advance the bark becomes cracked, and less smooth: the branches are produced irregularly on every side, standing almost horizontal, and the young slender shoots frequently hang down: these branches stand but thin, and the younger branches only have leaves, so that when the trees are grown large they make but an indifferent appearance, being so thinly clothed with the leaves: the young branches are flat, and the small leaves are placed over each other like the scales of fish: the flowers are produced from the side of the young branches, pretty near to the footstalk: the males grow in oblong catkins, and between these the females are collected in form of cones. When the former have shed their farina, they soon drop off; but the latter are succeeded by oblong cones, or strobiles, having obtuse smooth scales, containing one or two oblong seeds. It is a native of Siberia and Canada, where it is very plentiful, but not much further south.

There are different varieties; as the American Sweet-scented, and Variegated-leaved.

The second species has the branches growing closer together, and much more adorned with leaves, which are of a brighter green colour, and

make a much better appearance than the former: the branches cross each other at right angles: the leaves are flat, but the single divisions are slender, and the scales smaller, and lie closer over each other than those of the first sort: the cones (strobiles) are also much larger, of a beautiful gray colour, and their scales end in acute reflexed points. It is a native of China and Japan.

Culture.—These plants may be increased by seeds, layers, and cuttings.

Good seeds should be obtained and be sown soon after they are ripe, or as soon as they can be obtained, in autumn or spring, in pots or boxes of light earth, covering them half an inch deep, placing the pots, &c. in a sheltered warm situation, or under the shelter of a frame in bad weather, especially when sown in autumn, that they may be protected from severe frosts: they sometimes come up in the spring, but are frequently apt to remain in the ground till the second year. When the plants are come up, the pots should be placed in an east border to have only the morning sun, but open to the free air, giving frequent but very moderate waterings all the summer; and in winter removing the pots again to a sheltered place till spring, when they may be pricked out in nursery-rows; or, when they are small and weakly, continued in the pots another year, placing them in a shady situation during summer, and in a sheltered place in winter; and in spring following planting them out in the nursery, in rows a foot or two asunder, to remain to acquire size and strength for planting out where they are to remain.

The layers should be made from the young shoots of one or two years growth, which may be laid down early in autumn, bending down the branches to the earth, and laying all the young wood in by slit- or twist-laying, with the tops only appearing a little above ground; shortening any that have much longer tops than the others: they mostly emit roots in the earth, and form proper plants by autumn following; when, or rather in spring after, they should be separated from the stools, and be planted in nursery-rows, to remain two or three years, or till of a proper size for the shrubbery, &c.

The cuttings should be made from the strong young shoots of the same year's growth, which should be planted in the autumn, in a shady border, taking the opportunity of showery weather, if possible, for the business: they should be cut off with a small part of the old wood, where practicable, and be planted in rows a foot asunder, closing the earth well about them: they will be properly rooted in one year

for planting out in wider nursery-rows: they may also be planted in pots, and placed in a hot-bed, in order to have them more forward.

They may be planted out into the borders, &c. in the autumn or early spring months.

They are highly ornamental evergreens, proper for adorning the shrubbery and other parts, having a fine effect also when disposed singly in borders, &c. and in open spaces of grass; in all of which situations they should be suffered to grow with their full branches, in their own natural way, except reducing with a knife any low straggling or rambling branches occasionally: this is all the culture they require afterwards.

They may also be employed as timber-trees, in the evergreen forest-tree plantations.

And those in the pots, as the Chinese Arbor Vitæ, may be placed among other potted plants to adorn any particular compartment, and in assemblage with green-house plants for variety.

THUYA. See THUJA.

THYMBRA, a genus furnishing plants of the under shrubby, exotic kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ* or *Labiatæ*.

The characters are: that the calyx is a one-leaved perianth, subcylindrical, keeled at the sides, two-lipped at the mouth: upper lip wider, half-three-cleft, equal, converging; lower narrower, two-parted: the corolla is ringent: tube subcylindrical: upper lip flat, straight, half-two-cleft, obtuse; lower three-cleft, almost equal, flat: the stamina have four filiform filaments, approaching by pairs: the two lower ones shorter: anthers two-lobed: lobes remote, under the upper lip of the corolla: the pistillum is a four-cleft germ: style filiform, half-two-cleft: stigmas two, acute: there is no pericarpium: calyx unchanged: the seeds four.

The species cultivated are: 1. *T. spicata*, Spiked Thymbra; 2. *T. verticillata*, Whorled Thymbra.

The first is a low shrubby plant like heath, branching out into slender woody stalks which are six or eight inches long, covered with a brown bark, and garnished with narrow acute-pointed leaves about half an inch long, sitting close to the stalks opposite; they have an aromatic odour when bruised: the stalks are terminated by thick close spikes of purple flowers, near two inches long: the calyxes are stiff and hairy; they are cut half their length into acute segments: out of these the flowers peep, with their two lips; the upper is concave and arched, the under cut into three equal portions, and these are a little reflexed: they appear in June

and July, and in warm seasons are sometimes succeeded by seeds which ripen in autumn. It is a native of Mount Libanus, Macedonia, Spain, &c.

The second species has a shrubby stalk which seldom rises much more than a foot high, putting out many small woody branches, which have narrow spear-shaped leaves with many punctures; they stand opposite, and are of an aromatic flavour: the flowers grow in whorled spikes at the end of the branches: the leaves which stand under each whorl are broader than those below, and are covered with fine hairs: the flowers are purple, and sit close to the stalks: the upper lip is concave, and ends with two obtuse points; the lower ends with three equal points: these appear about the same time with the other, and in warm seasons the seeds ripen in this climate. It is a native of Spain and Italy.

Culture.—These plants may be increased by seeds, slips, and cuttings.

The seeds should be sown in the early spring in a warm border, and sheltered from bad weather by glasses; or, which is better, in pots filled with light mould, and placed in a mild hot-bed: when the plants have attained some growth they should be set out or removed into separate pots.

The slips and cuttings should be planted out in the spring and summer, and when well rooted removed where they are to grow: they also sometimes succeed by bottom offsets planted out as above.

They afford variety among other potted green-house plants.

THYME. See THYMUS.

THYMUS, a genus containing plants of the low, aromatic, perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ* or *Labiatæ*.

The characters are: that the calyx is a one-leaved perianth, tubular, half-five-cleft into two lips, permanent, having the throat closed with villose hairs: upper lip wider, flat, erect, three-toothed: lower lip two-bristled, of equal length: the corolla one-petalled, ringent: tube length of the calyx: throat small: upper lip shorter, flat, erect, emarginate, obtuse; lower lip longer, spreading, wider, triid, obtuse: middle segment wider: the stamina have four filaments, curved in, two of which are longer: anthers small: the pistillum is a four-parted germ: style filiform: stigma bifid, acute: there is no pericarpium: calyx narrowed at the neck, cherishing the seeds in its bosom: the seeds four, small, roundish.

The species cultivated are: 1. *T. Serpillum*,

Wild Thyme; 2. *T. vulgaris*, Garden Thyme; 3. *T. Mastichina*, Mastic Thyme; 4. *T. Virginicus*, Virginian or Savory Thyme.

The first has a woody, fibrous, brown, perennial root: the stems numerous, woody, branched, leafy, pubescent, commonly tinged with red: branches alternate: the leaves petioled, elliptic or ovate, obtuse, quite entire, hollow-dotted with little pellucid glands, ciliate at the base and on the petiole with a few fine white hairs; otherwise it is commonly smooth, though sometimes hairy all over: the heads of flowers terminating, roundish, with little leaves among them: the flowers pedicelled, and of a purplish red colour. It is a native of Europe, flowering in July and August.

There are several varieties; as the Broad-leaved, Narrow-leaved, Variegated-leaved, Silver-striped-leaved, Citron-scented or Lemon Thyme, Great Purple-flowered.

The second species is more hoary, higher, harder, and more woody than the first: the leaves are whiter, narrower, and the flowers smaller. It is a native of the South of Europe and Siberia, flowering from May to August.

There are different varieties; as the Broad-leaved, the Narrow-leaved, and the Variegated or Striped-leaved Thyme.

The third is a shrub, a foot in height, or a little more: the leaves heaped on the stem, linear or even ovate, the lower hoary beneath, the upper ones smooth: whorls hirsute: the teeth of the calyx hairy, and as it were feathered. It is a native of Spain.

The fourth species has a perennial root; but the stalk is annual, rising about a foot and half high, stiff, angular, branching out towards the top: the leaves stiff, pointed, about an inch and half long, and a quarter of an inch broad in the middle, pointed at both ends, and having a strong scent of pennyroyal: the flowers are white, collected into globular heads, appearing in July; but the seeds seldom ripen in this climate. It is a native of North America.

Culture.—These plants may be easily raised from seed, by slipping the roots and branches, and by cuttings; but the seed method is seldom practised except with the second sort, or Garden Thyme: the seed should be sown in the early spring on light, rich, dry ground, which should be properly dug over, and the surface be made moderately smooth with the spade: as the seed is small, it should not be sown too thick, or be covered too deep: the seed is best sown while the ground is fresh stirred, either broad-cast on the surface, raking it in lightly, or in flat shallow drills, earthed over thinly: the plants appear

in two or three weeks. It is necessary to be careful to keep them well weeded, giving occasional light waterings in dry weather; and by June they will require thinning, especially if the plants are to grow stocky, and with bushy full heads; in which case they should be set out to six or eight inches distance; when those thinned out may be planted in another place, in rows, six or eight inches asunder, giving water till fresh rooted, keeping the whole clean from weeds by occasional hoeing between them in dry days, which will also stir the surface of the earth, and much improve the growth of the plants: they will be in perfection for use in summer or early in autumn.

Sometimes the market kitchen-gardeners raise large quantities in beds, for daily supply, leaving the whole thick: when of proper growth they pull them clean up root and top together, from time to time, as wanted, and tie them in bunches for sale.

But it is always proper to thin out, or transplant a quantity in single bunches, to grow stocky and bushy for occasional supplies.

When intended to increase any particular varieties, and continue them the same with certainty, it can only be effected by slips and cuttings.

In respect to the offsets and slips, all the sorts multiply by offsets of the root and slips of the branches: the rooted slips are the most expeditious method, as the old plants increase into many offset-stems rising from the root, each furnished with fibres; and by taking up the old plants in the spring, &c. and slipping or dividing them into separate parts, not too small, with roots to each, and planting them in beds of good earth, in rows half a foot asunder, giving water directly, and repeating it occasionally in dry weather till they have taken root, and begin to shoot at top; they soon grow freely, and form good bushy plants in two or three months.

The strong slips of the branches without roots, succeed when planted any time in the early spring season in a shady border, in rows four or five inches distant, giving due waterings; and become good plants by autumn, when they may be planted out where they are to remain.

The cuttings of the young branches grow readily, the same as the slips, when planted at the same season in a shady place, and well watered.

The Common Thyme is in universal use as a pot-herb for various culinary purposes; it may also be employed in assemblage with other small plants, to embellish the fronts of flower-borders, shrubby clumps, small and sloping banks, &c. placing the plants detached or singly,

to form little bushy tufts, and in which the variegated sorts, and the Silver Thyme and Lemon Thyme particularly, form a very agreeable variety. The Lemon Thyme is also in much estimation for its peculiar odoriferous smell. Some of each of these sorts may also be potted, in order to move occasionally to any particular places as may be required, and under occasional shelter in severe winters to preserve the plants more effectually in a lively state; likewise some of the Mastic Thyme. Spanish and Portugal Thymes are also sometimes potted for the same purpose, and to place under the protection of a garden frame or green-house in winter, to continue them in a more fresh and lively growth: and sometimes some of the smaller Thymes are sown or planted for edgings to particular beds or borders for variety, such as the Lemon Thyme, Silver-leaved and variegated sorts; also occasionally the Common Thyme; and all kept low, close, and regular, by clipping them at the sides and tops annually in the summer season.

TICKSEED-SUN-FLOWER. See **COREOPSIS**.

TILIA, a genus containing plants of the ornamental tree kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a five-parted perianth, concave, coloured, almost the size of the corolla, deciduous: the corolla has five petals, oblong, obtuse, crenate at the tip: the stamens have numerous filaments, (thirty and more) awl-shaped, length of the corolla: anthers simple: the pistillum is a roundish germ: style filiform, length of the stamens: stigma a blunt pentagon: the pericarpium is a coriaceous capsule, globular, five-celled, five-valved, opening at the base: the seeds solitary, roundish.

The species are: 1. *T. Europæa*, European Lime Tree; 2. *T. Americana*, Broad-leaved American Lime Tree; 3. *T. pubescens*, Pubescent Carolina Lime Tree; 4. *T. alba*, White Lime Tree.

The first is a tall upright tree, with smooth spreading branches thickly clothed with alternate, petioled, heart-shaped, smooth, serrate leaves, pointed at the end, oblique at the base, glaucous beneath, and the veins, where they branch off from the nerve, being furnished with a tuft of glandular wool, as in the *Laurustinus*: the flowers, which are delightfully fragrant, especially at night, come forth in July, in umbels or cymes, (from three to five together,) on long axillary peduncles, with a singular, oblong, blunt, membranaceous, pale, entire bracte, nearly

as long as the peduncle, and attached to it for about half its length, and falling off with it. It is a native of Europe, &c.

It is, though little used, a handsome tree, having a smooth taper straight trunk, and the branches forming a beautiful cone. The foliage also is smooth and elegant: it grows to a very large size, and affords good shade: it makes a fine detached object in parks and open lawns, planted singly: the branches are so tough as seldom to be broken by the winds, and the flowers have a delightful fragrance: the wood is soft, but capable of being turned into light bowls and dishes, &c.

There are several varieties; as the Narrow-leaved, the Broad-leaved, the Elm-leaved, the Red-twiggèd, the Smooth Small-leaved, the Smooth Large-leaved, the Soft Hairy-leaved, the Wrinkled-leaved, and the Striped-leaved.

The second species has the branches covered with a dark brown bark: the leaves are large, heart-shaped, ending in acute points, are deeply serrate, and of a full green on their upper side, but of a pale green and a little hairy on their under side, standing upon long slender footstalks: the petals are narrower, and have nectariums growing to their base: the flowers do not appear till late in July, a full month after the common sort. It is a native of Virginia and Canada, and was brought from New England by the name of Black Lime.

The third is a tree of much smaller growth than either of the former: the branches spread more horizontally: the leaves are smaller, and have a smoother surface; they are heart-shaped, but the midrib runs obliquely to the footstalk, so that one side of the leaf is much larger than the other; the edges are slightly serrate, and their ends run out into long acute points: the bunches of flowers stand upon long slender footstalks; the petals are narrow, and end in acute points; have each a narrow, nectarium fastened to their base on the inside, standing erect close to the petals: the flowers emit a very fragrant odour, and come out towards the end of July. It is a native of Carolina.

The fourth species has the leaves snow-white beneath, and the flowers as in the second sort, but smaller. It is a native of North America, or Hungary.

Culture.—These trees may be increased by seeds, layers and cuttings.

The seed, when ripe in the autumn, should be beaten down, keeping the green-twiggèd and red-twiggèd sorts separate; and be sown soon after, or preserved dry and sound till spring; sowing it in a bed or border of common earth, previously digging the ground, and dividing it

into four-foot wide beds; drawing the earth off the surface evenly, about an inch deep, into the alleys; then sowing the seeds thinly, touching them lightly down into the earth with the back of the spade, directly earthing them over to the above depth.

When they come up in the spring, the beds should be kept clean from weeds, giving moderate waterings in dry weather, to forward the plants in growth as much as possible, in order to be fit for planting out in nursery-rows by autumn or spring following; though, if they have shot rather weakly, they should stand another year, then be planted out in rows two feet and a-half asunder, by eighteen inches distance in the lines, to remain three or four years or more to acquire a proper size for the purposes intended, trimming off the large side-branches from the lower part of the stem occasionally, to encourage their aspiring more expeditiously at top, which should be suffered to remain entire: these trees, when raised from seed, generally assume a more handsome and expeditious growth than such as are raised from layers and cuttings. When they are from about five or six to eight or ten feet high, they are of proper size for final planting out; though, when designed as forest-trees for timber, it is advisable to plant them finally while they are young, as not more than from three or four to five or six feet high.

They are all raised readily by the layer method; and for this purpose proper stools must be prepared, and the young shoots of a year or two old are the proper parts for being laid down, which should be performed in autumn or winter, by slit-laying, shortening the tops of each layer within a little of the ground: they are mostly rooted by autumn following, and fit to plant out in nursery-rows, being then managed as the seedlings.

When cuttings are employed, the strong young shoots of the year should be chosen in autumn or spring, and planted in a moist good soil; or any scarce sorts may be planted several together in pots, and plunged in a hot-bed, as they more readily strike root in that way.

These two last methods are the proper ones for raising the varieties with certainty.

These trees afford ornament and variety among other deciduous trees in the shrubbery, plantations, &c.

TINUS. See VIBURNUM.

TOAD-FLAX. See ANTIRRHINUM.

TOBACCO. See NICOTIANA.

TOLUIFERA, a genus comprising a plant of the exotic tree kind for the stove.

It belongs to the class and order *Decandria*

Monogynia, and ranks in the natural order of *Terebinthaceae*.

The characters are: that the calyx is a one-leaved perianth, bell-shaped, five-toothed, almost equal, with one angle more remote: the corolla has five petals, inserted into the receptacle, of which four are equal, linear, a little longer than the calyx; the fifth twice as big, obcordate: claw length of the calyx: the stamina have ten filaments, very short: anthers longer than the calyx: the pistillum is an oblong germ: style none: stigma acute: the pericarpium is a round berry, four-celled, four-seeded: the seed single, ovate.

The species is *T. Balsamum*, Balsam of Tolu Tree.

It is a tree of large size: the bark is very thick, rough, and of a brown colour: the branches spread out wide on every side: the leaves are alternate, oblong-ovate, four inches long, and two inches broad in the middle, rounded at the base, acuminate at the end, smooth, of a light green colour, on very short strong footstalks: the flowers are produced in small axillary racemes or bunches, each on a slender pedicel: the fruit roundish, the size of a large pea, divided into four cells, each containing one oblong-ovate seed. It is a native of Spanish America; and is the tree from which the Balsam of Tolu is made.

Culture.—This tree is raised from seeds, which should be obtained from its native situation, and be sown as soon as possible afterwards in pots of light earth, plunging them in the bark-bed of the stove. When the plants have three or four inches growth, they should be potted off separately, giving them water, and replunging them in the bed. They afterwards only require to be managed as other woody stove plants.

They afford variety in stove collections.

TOOTHACH TREE. See ZANTHOXYLUM.

TORCH-THISTLE. See CACTUS.

TOUCH-ME-NOT. See IMPATIENS and MOMORDICA.

TOURNEFORTIA, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a five-parted perianth, small: segments awl-shaped, permanent: the corolla one-petalled, funnel-form: tube cylindrical, globular at the base: border half-five-cleft, spreading: segments aminate, horizontal, gibbous in the middle: the stamina have five filaments, awl-shaped, at the

throat of the corolla: anthers simple, in the throat, converging, acuminate: the pistillum is a globular superior germ: style simple, length of the stamens, club-shaped: stigma circumcised, entire: the pericarpium is a globular berry, two-celled, perforated by two pores at top: the seeds four, subovate, separated by pulp.

The species cultivated are: 1. *T. hirsutissima*, Hairy Tournefortia; 2. *T. volubilis*, Climbing Tournfortia; 3. *T. foetidissima*, Fetid Tournfortia; 4. *T. humilis*, Dwarf Tournfortia; 5. *T. cymosa*, Broad-leaved Tournfortia; 6. *T. argentea*, Silvery Tournfortia; 7. *T. suffruticosa*, Hoary-leaved Tournfortia.

The first has a shrubby stem, somewhat scandent, branched, covered with a ferruginous shaginess: the leaves oblong, entire, nerved, hairy all over, but extremely so beneath: the spikes or racemes very much branched, stiff and straight, spreading a little: the flowers white, directed all one way. It is a native of the islands in the West Indies.

The second species has a twining woody stalk, which twists about the neighbouring trees for support, and rises to the height of ten or twelve feet, sending out several slender woody branches: the flowers are produced in branching spikes from the side and top of the branches; are small and white, and succeeded by small white succulent berries, having one or two black spots on each. It is a native of Jamaica, flowering in July and August.

The third has shrubby stems, ten or twelve feet high, sending out many branches: the leaves alternate, five inches long, two inches and a half broad in the middle, hairy on their under side, standing upon short foot-stalks: the branches are terminated by long branching spikes of flowers, ranged on one side; some of the foot-stalks sustain two, others three, others again four spikes of flowers, near five inches in length, reflexed at the top: the flowers are of a dirty white colour, small, and closely set; they are succeeded by small succulent fruit. It is a native of Jamaica.

The fourth species has low shrubby stalks, which seldom rise more than three feet high, sending out a few slender woody branches: the leaves are rough, dark green on their upper, but pale on their under surface: the flowers come out in single axillary spikes; are white, and succeeded by small succulent berries. It is a native of South America.

The fifth has the stem a fathom in height: the branches herbaceous, angular, grooved, smooth: the leaves ovate-lanceolate, long, petioled, smooth, wrinkled beneath: the flowers sessile,

on one side, disposed in two rows. It is a native of Jamaica, flowering in July.

The sixth species is a shrub, scarcely the height of a man: the trunk is very short, covered with a deeply cloven bark: the branches spreading very much, hirsute: the leaves at the ends of the branches, alternate, approximating into a rose as in *Sempervivum Canariense*, ovate or tongue-shaped, (being narrowed into the petiole,) sessile, rounded at the end, white all over, with a silky hairiness pressed close to them: the panicle large, divided into spikes, directed one way, and rolled back: the flowers snow-white. It is a native of the shores of the sea of Ceylon, &c.

The seventh has woody stalks which rise five or six feet high, from which spring out many slender woody branches: the leaves about two inches long, and an inch broad in the middle, rounded at each end with acute points; of a dark green on their upper surface, but having a white down on their under side, and sitting close to the branches: the flowers terminating and axillary, in slender branching spikes, which are recurved; and the flowers ranged on one side of them, white, and succeeded by small succulent berries. It is a native of Jamaica.

Culture.—These plants may all be increased by seeds, which should be procured from the countries where they grow naturally, and sown in small pots filled with light earth, and plunged into a hot-bed of tanners bark. They sometimes grow the first year, but often remain in the ground a whole year: therefore, when the plants do not come up the same season, the pots should be plunged in autumn into a tan-bed in the stove, where they should remain all the winter, and in the spring be removed and plunged into a fresh tan-bed, which will soon bring up the plants if the seeds were good. When these are fit to remove, they should be each planted in a small pot, and plunged into a tan-bed, where they must be shaded from the sun till they have taken new root, and then be treated in the same way as other tender plants from the same countries, which require to be kept constantly in the bark-stove. They may also sometimes be increased by cuttings, which should be planted in pots and plunged into the bark-bed.

They afford variety in stove collections.

TOXICODENDRON. See RHUS.

TRACES, LADIES'. See OPHRYS.

TRACHELIUM, a genus containing a hardy herbaceous plant of the perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceae*.

The characters are: that the calyx is a five-

parted perianth, very small, superior: the corolla one-petalled, funnel-form: tube cylindrical, very long, very slender: border patulous, small, five-parted: segments ovate, concave: the stamina have five capillary filaments, length of the corolla: anthers simple: the pistillum is a three-sided-roundish inferior germ: style filiform, twice as long as the corolla: stigma globular: the pericarpium a roundish capsule, obtusely three-lobed, three-celled, opening by three holes at the base: the seeds numerous, very small.

The species cultivated is *T. caeruleum*, Blue Throatwort.

It has a perennial (biennial) fleshy, tuberous root, sending out many fibres which spread wide on every side: the leaves about two inches long, and one inch broad in the middle, ending in acute points: the stalks rise a foot and half high, with leaves on them shaped like those at the bottom; sometimes there are two pretty large leaves, and one or two smaller from the same point, or one large and three smaller; these come out alternate, and the upper part of the stalk, immediately under the umbel, is naked, except two or three narrow leaves, which are close to the foot-stalks of the flowers; these are disposed in form of an umbel composed of many small ones: the flowers are small, and of an azure blue colour, appearing in June and July. It is a native of Italy and the Levant.

Culture.—It is raised from seeds, which should be sown in the autumn when well ripened, or in the spring, in a bed or border of light mould. And when the plants are two or three inches in height, they should be set out in nursery rows six inches apart, to remain till the following autumn, when they should be planted out where they are to remain.

They afford ornament in rock-works, and other situations where the earth is poor.

TRADESCANTIA, a genus furnishing a plant of the hardy herbaceous perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Ensatae*.

The characters are: that the calyx is a three-leaved perianth: leaflets ovate, concave, spreading, permanent: the corolla has three orbicular petals, flat, spreading very much, large, equal; the stamina have six filiform filaments, length of the calyx, erect, villose, with jointed hairs: anthers kidney-form: the pistillum is an ovate germ, obtusely three-cornered: style filiform, length of the stamens: stigma three-cornered, tubulous: the pericarpium is an ovate capsule, covered by the calyx, three-celled, three-valved: the seeds few, angular.

The species is *T. Virginica*, Common Virginian Spiderwort, or Flower of a Day.

There are other species that may be cultivated.

It has roots composed of many fleshy fibres: the stalks smooth, rising a foot and half high: the leaves long, smooth, keeled, embracing: the flowers in clusters, composed of three large spreading purple petals; they appear early in June; and though each flower continues but one day, yet such is the profusion, that there is a succession of them through the greater part of the summer. It is a native of Virginia and Maryland, flowering in June.

There are varieties with deep blue flowers, with white flowers, with red flowers, and with purple flowers.

Culture.—They are readily increased by parting the roots, and planting them out in the autumn, or early in the spring, in a bed or border of common earth.

And also by seeds sown at the same seasons in similar situations, the plants being pricked out into other beds in the summer, and removed in the autumn to the places where they are to grow.

They afford ornament in the common borders among other flower plants.

TRAGOPOGON, a genus containing plants of the hardy, herbaceous, biennial, and perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Aequalis*, and ranks in the natural order of *Compositae Semiflosculosae*.

The characters are: that the calyx is common simple, eight-leaved: leaflets lanceolate, equal, alternately interior, all united at the base: the corolla compound imbricate, uniform: corollets hermaphrodite, many, exterior ones a little longer: the proper one-petalled, ligulate, truncate, five-toothed: the stamina have five filaments, capillary, very short: anther cylindrical, tubulous: the pistillum is an oblong germ: style filiform, length of the stamens: stigmas two, revolute: there is no pericarpium: calyx converging, acuminate, length of the seeds, ventriculose, at length reflexed: the seeds solitary, oblong, attenuated to both ends, angular, rugged, terminated by a long awl-shaped down-bearing stipe: down feathered, flat, with about thirty-two rays: the receptacle naked, flat, rugged.

The species are: 1. *T. porrifolius*, Purple Goat's-beard, or Salsafy; 2. *T. pratensis*, Common Yellow Goat's-beard; 3. *T. crocifolius*, Crocus-leaved Goat's-beard; 4. *T. Dalechampii*, Great-flowered Goat's-beard.

The first has a biennial root, long, tapering or round-fusiform, that and the whole plant



Painted by Syd. Edwards. London Published June 1805, by G. Kearsley Fleet Street Engraved by F. Atkinson

1 *Tradescantia virginica*
 Virginian Spider wort

2 *Trillium sessile*
 Sessile Trillium.

3 *Thalictrum aquilegifolium*
 Feathered Columbine.

abounding with a sweet milky juice, which soon turns to a brown resin, from the evaporation of its watery particles: the herb smooth, glaucous, about four feet high: the stem round, erect, branching, leafy: the leaves lanceolate, scarcely waved, ending in a tapering straightish point: the flowers solitary, terminating: the stalk which supports them tapering from the calyx downwards; of a purple colour.

It is cultivated in gardens under the name of Salsafy. The roots boiled or stewed have a mild sweetish flavour. The stalks are also cut in the spring, when they are four or five inches high, and dressed like Asparagus.

The second species has a biennial root, fusiform or fleshy tapering, abounding with milk, which is sweet not acrid: the whole herb smooth and very even: the stems several, branched, eighteen inches or two feet high, leafy, round, often tinged with purple: the branches elongated into a simple naked peduncle: the leaves alternate, sessile, some radical, others embracing the stem and branches, all broad and somewhat inflated at the base, but terminating in a long narrow point, which is flaccid or apt to hang down; very generally the margin towards the bottom is more or less waved or curled: the peduncles terminating, solitary, one-flowered, not swelling out at top, but of an equal thickness throughout: the flowers large and handsome, opening at day-break, and closing before noon. It is a native of Europe and Siberia, flowering in June.

The third resembles the first, but is scarcely a foot high: the leaves are villose at the base, but become smooth by age: the flowers violet, of two rows only, but in the middle rather yellow. It is a native of Italy and the South of France, and is biennial.

The fourth species has a perennial, thick and succulent root: the stems about a foot high, sometimes less: the leaves large, thick, villose, toothed and sinuated; the upper ones often entire: from the centre of the root-leaves, which spread in a rose, rises a naked thick flower-stalk, villose and thicker in the upper part, where it terminates in a very large flower of a pale yellow or sulphur colour. It is a native of Spain, and the South of France, &c. flowering from June to October.

Culture.—The first sort is only raised from seed, which should be sown in the spring, in an open situation to remain, either broad cast and raked in, or in shallow drills eight or nine inches asunder, scattering the seeds thinly, and covering them half an inch deep; and when the plants are come up two or three inches in height, they should be thinned and weeded by hand or

the hoe, leaving them eight or ten inches asunder, repeating the weeding as required during the summer, which is all the culture they require, and they will have large roots by the autumn, as September or October, when they may be begun taking up for use; and in November, when the leaves begin to decay, a quantity be preserved in sand for use in time of severe frost, when those in the ground cannot be got up.

In spring, when those remaining in the ground begin to shoot, the shoots, when a few inches high, may be cut for use, which, when quite young and tender, on being boiled, are excellent eating. A few plants should be suffered to run up to stalk every spring, to produce seeds.

The two following sorts may also be raised from seed in the same way, and the plants, when a little advanced in growth, be planted out if they are required for variety in any particular part.

The third sort may also be propagated by parting the roots in autumn and spring, and planting them where they are to remain.

The first is a culinary plant, and the others afford variety in the borders, &c.

TRAINED TREES, such young fruit-trees as are designed for walls and espaliers, being trained in the nursery to the intended form, by planting against any kind of walls, pales, reed-hedge, or other close fence; when a year old from the grafting or budding, training them in the manner of wall or espalier trees, for two, three, or more years, till they obtain a good spread of branches, and are arrived to a fruitful state, in order that those who are in haste to have their walls or espaliers covered at once with bearing trees, may have it accomplished in one season. The trees thus trained in the nursery, &c. on being planted out in autumn or spring to the places intended, cover the wall or espalier in some manner at once, and often bear fruit the ensuing summer.

In the nurseries large quantities of these sorts of trees are always kept ready trained for sale, particularly peaches, nectarines, and apricots for walls; in many places, also, cherries and plums, &c., also apples, pears, and other fruit-trees, for espaliers; and are proper to furnish the walls and espaliers of new gardens, and occasionally those of old ones, to bear fruit, till younger trees, planted untrained, become fruitful, or for supplying the places of old trees that fail, or bear bad fruit.

When it is intended to raise trained fruit-trees for walls and espaliers, a quantity of the best young plants of the respective sorts, dwarf and

half standards, of one year old, with the first shoots from the budding and grafting entire, should be planted out in autumn against some kind of fence in a free open situation, not less than four or five feet high, placing them from five or six to eight or ten feet distant, to remain for training. These in the spring following, just as they begin to make an effort for shooting, should be headed down, with a clean sloping cut upward, to within four, five or six eyes or buds of their origin, or place of insertion in the stock, especially those intended for dwarfs, and the half-standards, if worked on tall stocks; which prevents their running up too high with a single naked stem, and causes them to throw out lateral shoots from the lower part to fill the wall or espalier regularly with branches quite from the bottom upward; as they soon after push forth strong shoots from all the remaining lower buds, sufficient to give the tree its first proper formation as a wall tree, &c.; which shoots, when advanced in length in summer, should be trained along to the fence equally to the right and left, in a somewhat inclined position at full length till next spring, when these shoots may also be cut down to six or eight inches length, to force out a further supply of more branches near the bottom, as it is proper that they should be well furnished with branches below, in order to cover the wall, &c. well at the bottom part.

The summer's shoots should be shortened in this manner; more or less the two or three first springs, as may be necessary, in order to obtain a proper spread of lower branches to give the tree its intended form; though this work of pruning short to obtain laterals may also be performed occasionally in summer, in May or early in June, on the strong young shoots of the year, cutting or pinching them down to a few eyes; but the first is the best mode.

As the supply of branches thus obtained arrive at proper lengths, in the summer they should be all trained in along close to the wall, and if any fore-right or back shoots come out, they should be rubbed off close, leaving all the well-placed side and terminal shoots in every part, and letting the whole, or as many as possible, be trained in during this season, to have a plenty to choose from in the general pruning season, laying them in close to the wall, &c. equally to the right and left, on each side of the tree, in a spreading somewhat horizontal manner, no where crossing one another but at parallel distances, and mostly all at full length during the summer's growth, to remain till the general winter or spring pruning.

In the winter pruning, where more wood was trained up in summer than appears necessary,

or than can be trained in with due regularity, it should be retrenched, as well as any remaining fore-right or back shoots and other irregular growths omitted in summer, be now all pruned out, cutting them quite close to their origin. The whole should then be close nailed to the wall.

Having thus procured proper heads, they should afterwards be pruned according to the method peculiar to each respective sort, as directed under their culture, some requiring the branches to be shortened annually, others to be mostly trained at full length. See DWARF and ESPALIER TREES, PRUNING, &c.

The training of espalier trees is effected exactly in the same manner, only these may be trained as they stand in the nursery lines, in the open quarters or borders, &c. by ranging some stout stakes in the ground along one side of each tree, not in a continued straight range immediately the way of the row, but those of each tree ranged separate and obliquely, somewhat cross-ways the row as it were, that the branches of the different trees may range beside one another, and thereby have more room to extend the branches both ways, than the common distance in the nursery lines would admit, if ranged directly the way of the row.

It may be remarked that in general, unless good Trained Trees can be readily obtained, of from three or four to five or six years old, of a clean free growth, it will be better to plant entire young untrained trees of one or two years old, immediately from the nursery, putting them at once where they are to remain, managing them afterwards as the Trained Trees, to give them the proper form of head.

Some, in order to have as great a chance as possible, plant young untrained trees to remain, and Trained Trees of a bearing state, dwarfs and half-standards between, to cover the wall more effectually at once, and furnish a supply of fruit, until the young ones are trained and arrive at the bearing state; then, according as the trees of both sorts advance in that state of growth, those which appear the most prosperous are retained, and the others are gradually cut away, leaving the more thriving trees to occupy the wall wholly at last.

In most of the public nurseries, they raise Trained Trees for sale, which occupy all their close fences of walls, pales, &c. where they may be procured of almost any size, differing in price from three to five or ten shillings or more per tree, according to the sorts, age, and goodness of growth.

TRAILING ARBUTUS. See EPIGÆA.

TRAVELLER'S JOY. See CLEMATIS.

TREE CELANDINE. See BOCCONIA.

TREE GERMANDER. See TEUCRIUM.

TREE MALLOW. See LAVATERA.

TREE PRIMROSE. See OENOTHERA.

TREFOIL, SHRUBBY. See PTELIA.

TREFOIL, SNAIL. See MEDICAGO.

TREILLAGE, a sort of rail work consisting of ranges of light posts and railings, for the purpose of training espalier trees to, and occasionally for wall trees, where the walls do not admit of nailing the branches immediately against it; likewise for training wall-trees in forcing frames, &c. They are made in different ways, for use and ornament, as well as of different dimensions, from four or five to six or seven feet high.

For common espalier fruit-trees in the open ground, they are absolutely necessary, and may either be formed of common stakes and rails nailed together, or of regular joinery work.

The cheapest and the easiest, and soonest made Treillage for common espalier trees, is that formed with any kind of straight poles or stakes of underwood, as cut in the coppices, being then cut into proper lengths, and driven into the ground in a range at foot distances, all of an equal height, and then railed along the top with the same kind of poles, to preserve the whole straight and firm in a regular position. See ESPALIER.

And to render these still stronger, two or three horizontal ranges of rods may be nailed along the back part of the uprights, a foot or eighteen inches asunder.

The more elegant and ornamental Treillages are formed with regularly squared posts and rails of hard timber, neatly planed and framed together; having for this purpose deal or oak posts, uniformly worked two or three inches square; but if the main posts are of oak, it will be of advantage in respect to strength and durability, fixing the main posts in the ground ten or twelve feet asunder, with smaller ones between, ranging the horizontal railings from post to post in three or more ranges; the first about a foot from the bottom, a second at top, and one or two along the middle space, and, if convenient, one between each of the intermediate spaces; then fixing thin slips of lath, or the like, upright to the horizontal railing as far as the branches of the trees extend, ten inches or a foot asunder; and painting the whole white in oil colour, to render it more ornamental and durable. In training the trees, their branches are tied both to the railing of the Treillage, and the upright laths, according as they extend in length on each side. In either of the above cases, for an

espalier, five feet is generally of sufficient height, as, if much higher, the winds, having greater power, will loosen and displace them.

Where walls are built with large stones with the joints irregular and far asunder, and which do not afford opportunities, like brick walls, for nailing properly in the regularity which is required, a neat Treillage is sometimes uniformly erected all along close to the wall, to train and nail or tie the branches to in a regular manner.

These may be made of coarse pieces of battens, railings, &c. or of such as are wrought in a neat manner, according to the convenience and taste of the person who has them.

In frames and stoves, where wall trees are intending for forcing, as they are planted both against the back wall, and occasionally in a detached low range forward towards the middle or front space, Treillages are indispensably necessary upon which to arrange the branches of the trees in a regular expansion, not to train them immediately close to the wall of the flues of that department, but detached several inches, and formed with light neat squared upright battens, and small horizontal rails, uniformly framed together in a light open manner.

TREILLIS, a term sometimes employed to signify the same as treillage. See TREILLAGE.

TRILLIUM, a genus furnishing plants of the low, tuberous-rooted, flowery, perennial kind.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Sarmentaceae*.

The characters are: that the calyx is a three-leaved perianth, spreading: leaflets ovate, permanent: the corolla has three petals, subovate, a little bigger than the calyx: the stamina have six awl shaped filaments, shorter than the calyx, erect: anthers terminating, oblong, length of the filaments: the pistillum is a roundish germ: styles filiform, recurved: stigmas simple: the pericarpium is a roundish berry, three-celled: the seeds many, roundish.

The species are: 1. *T. cernuum*, Drooping Trillium; 2. *T. erectum*, Upright Trillium; 3. *T. sessile*, Sessile-flowered Trillium.

The first has a perennial tuberous root: the stem is erect, a foot high, simple, round, slightly striated, smooth: the leaves three together, terminating, on short footstalks, spreading, rhomboidal, pointed, entire, veiny, smooth, paler beneath: the flowers solitary, among the leaves, without bractes: the flower-stalk round, a little waved, smooth. It is a native of North America.

The second species has a taller stalk: the three

leaves are placed at a distance from the flower, which stands upon a long footstalk, and is erect: the petals are purple, larger, and end with sharper points. It is a native of Virginia, Canada, &c.

The third has a purple stalk: the three leaves grow at the top like the first; but they are much longer, and end in acute points: the petals are long, narrow, and stand erect; are of a dark brownish red: the calyx leaves are streaked with red: the leaves mottled. It grows in Carolina and Virginia.

Culture.—These plants may be increased by seeds, which should be sown on a shady border as soon as they become ripe in the autumn: when they appear in the spring, the plants should be kept clean from weeds, and in the autumn following be planted out where they are to remain and flower.

They succeed best in a light soil, where the situation is rather shaded.

They afford variety in such places.

TRIUMFETTA, a genus furnishing plants of the shrubby and herbaceous kinds.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a five-leaved perianth: leaflets lanceolate, arched below the tip, deciduous: the corolla has five petals, linear, erect, obtuse, concave, bent back, awned below the tip: the stamina have sixteen filaments, equal, ascending, length of the corolla, awl-shaped, erect; anthers simple: the pistillum is a roundish germ: style length of the stamens: stigma bifid, acute: the pericarpium is a globular capsule, fenced on every side with hooked prickles, four-celled: the seeds two, convex on one side, angular on the other.

The species cultivated are: 1. *T. Lappula*, Prickly-seeded Triumfetta; 2. *T. annua*, Annual Triumfetta.

The first rises with an upright stem to the height of six or seven feet; towards the bottom it becomes woody, and at top divides into four or five branches: the leaves placed alternately the whole length of the stem, about two inches and a half long, and almost two inches broad near the base, divided almost into three lobes toward the top, and the middle division ending in an acute point; they are veined on their under side, are covered with a soft brown down, and have several nerves running from the midrib to the sides; their upper side is of a yellowish green, and a little hairy; their borders are acutely but unequally serrate, and stand upon footstalks an inch in length: the branches are terminated by long spikes of flowers, which

come out in clusters from the side of the principal footstalk, at the distances of about an inch: the flowers are small, the petals narrow and of a yellow colour; they are, succeeded by burry capsules, round, and with long prickles placed on every side. It is a native of Jamaica, Martinico, &c. flowering in July and August.

The second species is an annual plant, rising about two feet and a half high, and sending out several branches on every side: the leaves ending in long acute points; some are heart-shaped, others have an angle on each side towards the point; they are from three to four inches long, and almost as much in breadth where broadest; they stand upon very long footstalks, and are notched on their edges: the flowers come out in long loose spikes at the top of the plant; are small and yellow. It is a native of India, flowering in September.

Culture.—This is increased by seeds, which must be procured from its native place, and be sown on a hot-bed, or in pots plunged in the bark-bed of the stove: when the plants have one or two inches growth, they should be removed into separate pots, replunging them in the bark-bed till well re-rooted.

They afterwards require to be kept constantly in the stove, or hot-house, and to have the management of other ligneous plants of the stove kind.

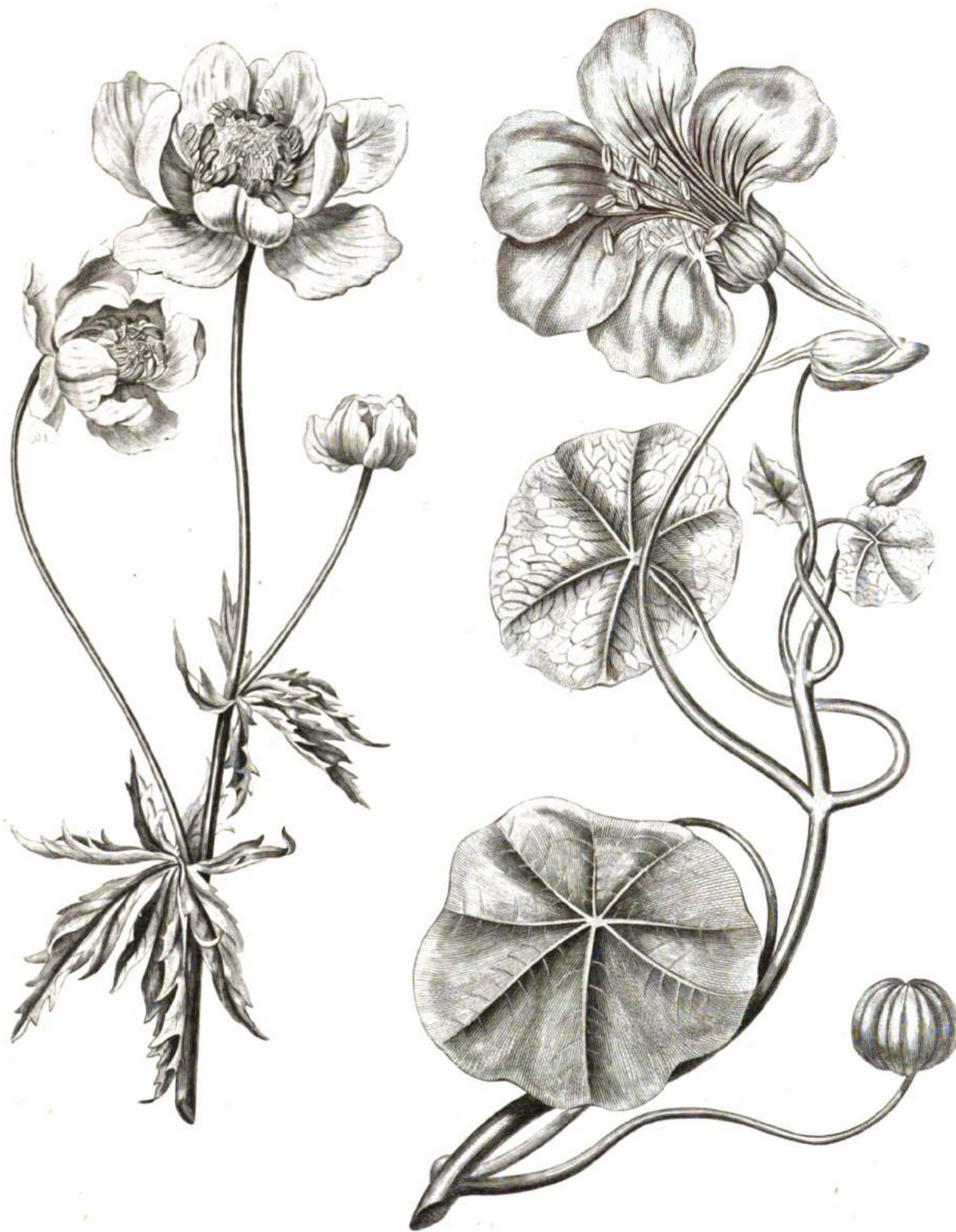
They produce variety in stove collections.

TROPÆOLUM, a genus furnishing plants of the herbaceous, annual, and perennial, trailing and climbing kinds.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Trihilatae*.

The characters are: that the calyx is a one-leaved perianth, five cleft, from upright spreading, acute, coloured, deciduous; the two lower segments narrower; horned at the back with an awl-shaped, straight, longer nectary: the corolla has five petals, roundish, inserted into the divisions of the calyx; two upper sessile; the others lower, with oblong, ciliate claws: the stamina have eight awl-shaped filaments, short, declining, unequal: anthers erect, oblong, rising: the pistillum is a roundish germ, three-lobed, striated: style simple, erect, length of the stamens: stigma trifid, acute: the pericarpium berries (or nuts) somewhat solid, three, on one side convex, grooved and striated; on the other angular: the seeds three, gibbous on one side, angular on the other, roundish, grooved and striated.

The species cultivated are: 1. *T. minus*, Small Indian Cress, or Nasturtium; 2. *T. majus*, Great Indian Cress, or Nasturtium.



Painted by Syd. Edwards

London Published Oct 1805 by G. Kearsley Fleet Street

Engraved by F. Santen

Trollius Americanus
American Globe flower

Tropaeolum majus
Greater Nasturtium



The first has an herbaceous, trailing stem: the leaves almost circular, smooth, grayish: the flowers axillary, on very long peduncles; composed of five acute-pointed petals, the two upper large and rounded, the three under narrow, jointed together at bottom, and lengthened out into a tail two inches long.

There are varieties with deep orange-coloured flowers inclined to red, with pale yellow flowers, and with double flowers.

The second species is larger in all its parts: the borders of the leaves are indented almost into lobes; and the petals are rounded at the top. The fruit consists of three berries, becoming juiceless when ripe, fungous, deeply grooved and wrinkled, gibbous on one side, angular on the other, narrowing upwards. It begins to flower in July, and continues till the approach of winter.

There are varieties with pale yellow flowers, orange-coloured flowers, and the double-flowered.

They are both natives of Peru, and commonly esteemed to be annual plants, though they may be continued through the winter, if they are kept in pots, and sheltered in a green-house or glass case, in like manner as the variety with double flowers.

The stalks will climb six or eight feet high, when they are trained up, and thus the flowers make a good appearance; but when they trail upon the ground, they will spread over the neighbouring plants and become unsightly: the flowers are frequently eaten in salads; they have a warm taste like the garden cress, and hence the plant has its common name of *Nasturtium*; they are likewise used for garnishing dishes: the seeds are pickled, and by some are preferred to most pickles for sauce, under the false name of capers.

Culture.—These plants in all the single varieties may be increased by seeds, which should be sown in the spring in patches where they are to flower in the borders, or in drills in the garden.

They afterwards only require to be kept free from weeds, and to be well supported by sticks.

The double variety must be increased by planting cuttings of the branches in pots of light mould in the early part of summer, placing them in the shade, and giving frequent light waterings: those planted early may be rendered more forward by being plunged in a moderate hot-bed.

It requires to be protected in the green-house in the winter, being well supported with sticks.

They all afford variety in the borders, clumps, &c. in the summer, and the double sorts among potted plants.

TROWEL, GARDEN, a trowel made of iron, in a hollow or scooped form, which is an

useful implement in taking up numerous sorts of small plants and bulbous roots, and replanting them in pots, sowing in patches, and various other similar light works: it should be from six to twelve inches long in the plate, and half as broad, and fixed on a short handle, to hold with one hand. From its being hollowed semi-circularly, it is remarkably handy in removing many sorts of small plants with a ball or lump of earth whole about their roots, so as not to feel their removal; lifting several sorts of bulbous flower roots, after the flowering is past in summer; planting bulbs in patches or little clumps about the borders, and also for digging small patches in the borders for sowing hardy annual flower-seeds on; likewise for filling mould into small pots in planting any sort of plants, stirring the surface of the mould in pots, and fresh earthing them when necessary: it is also highly useful for filling in earth about plants in hot-beds, and under frames, or any small compartments where a spade cannot be readily introduced.

They should be had of different sizes to suit different purposes.

TRUMPET FLOWER. See *BIGNONIA*.

TRUMPET HONEYSUCKLE. See *LONICERA*.

TUBEROUS ROOTS, such as consist of one or more swelled or knobbed tubers, of a solid fleshy substance.

In this tribe are comprised many plants of the ornamental flowery kind, and some esculents of the kitchen garden; as in the former anemone, ranunculus, filipendula, many sorts of iris, aconitum, pæony, orchis, cyclamen, winter-aconite, day lily, &c. some also with bulbo-tuberous roots, as gladiolus, polyanthes, or tuberose, ophrys, &c. and of the esculent tuberous roots are the potatoe and Jerusalem artichoke; all of which plants are principally perennial in their roots, being perpetuated annually by offsets.

TUBS, a sort of boxes calculated for containing large green-house exotics, and other potted plants and trees when grown too large for the pots.

Green-house plants, particularly in some of the larger-growing sorts, in a few years growth become too large to be contained longer in pots, even in those of the largest size; which being sometimes both too small for the increased roots of the plants, and of insufficient strength to admit of moving them with the plants, as large orange and lemon-trees, myrtles, oleanders, and other tree kinds, as well as large plants of the great American aloe, &c.: when any of these, or other similar large-growing trees and plants, are advanced considerably in size in their general

growth; some proper strong tubs of larger dimensions than the pots containing the plants should be prepared in proper time, in which to shift them.

These tubs are made by the coopers proper for this purpose, somewhat in the garden-pot form, a little wider at top than at bottom, from a foot and half to two and a half deep; the width in proportion; constructed of the strongest thick staves and bottoms, and well hooped with iron, and with two iron handles at top, by which to remove them; these handles being strong and generally hooked, especially in very large tubs, in order to receive a pole in each occasionally, that the tub and plant together may be more readily moved: the bottom of the tubs have auger holes bored in different parts, at regular distances, by which to discharge the superfluous moisture after watering, &c.

In tubbing large-grown plants, they should be removed from their present pots, with the balls of earth about the roots entire; and having earthed the bottom parts of the tubs, the plant should be set in with its whole ball of earth, filling up properly around, and an inch or two over the top of the ball with more fresh mould, and then watering. See SHIFTING PLANTS and POTTING.

TULIPA, a genus furnishing plants of the bulbous-rooted, flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariæ*.

The characters are: that there is no calyx: the corolla bell-shaped: petals six, ovate-oblong, concave, erect: the stamina have six awl-shaped filaments, very short: anthers quadrangular, oblong, erect, distant: the pistillum is a large germ, oblong, from three-cornered round: style none: stigma three-lobed, triangular: angles protuberant, bifid, permanent: the pericarpium is a three-sided capsule, three-celled, three-valved: valves ciliate at the edge, ovate: the seeds numerous, flat, incumbent in a double row, semicircular, separated by similar flocks.

The species cultivated are: 1. *T. Gesneriana*, Common Garden Tulip; 2. *T. sylvestris*, Wild or Yellow Tulip.

The first has the stem nearly upright or bending a little, taller and stronger than in the second, from a foot to eighteen inches in height: the leaves three, four, or five, embracing, doubled, lanceolate, acute, nerved, glaucous; the lowest near the bulb two inches and a half wide, the others gradually narrower: the flower large, erect, in a wild state most commonly red with a black base: petals ovate, blunt, smooth: the anthers commonly very dark-coloured or black;

the stigma three-lobed, each lobe bifid, bent back, and the edge curled back: the capsule superior, of a triangular prismatic form, three-grooved, transversely striated: the valves having a partition in the middle, and ciliate at the sutures with white silky vibrissæ turned inwards: the seeds obovate, narrowed towards the navel, flat on both sides, margined, rufescent, fastened horizontally in a double row to the central margin of the partitions. Before the fruit is fully ripe, the vibrissæ in this genus are glued together into three thin membranes, which being interposed between the columns of seeds, make the unripe capsules six-celled. It is a native of many parts of the Levant.

It is distinguished from the other, according to Martyn, by "its pubescent scape, spreading sweet-smelling corolla, the earliness of its flowering, and the smallness of its size."

In respect to the varieties, the editor of Miller's Dictionary observes, that "the old authors divided Tulips into *Præcoces* or Early-blowers, and *Serotinae* or Late-blowers, with an intermediate division of *Dubiae Mediæ*, Doubtful or Middle-blowers, which flowered between the two others, and for the most part rather belonged to the late-blowers. Modern florists," he says, "have almost neglected the early-blowers."

The first sort, according to Miller, "are not near so fair, nor do they rise half so high as the late ones; they are chiefly valued for appearing early in the spring: some of them will flower the middle of March in mild seasons, if planted in a warm border near a wall or other shelter, and others will succeed them, so that they will keep flowering until the general season for these flowers is come, which is towards the end of April.

"The several varieties of these early-blowing Tulips rise to different heights in their stems, and scarcely any two of them are equal. The Duke Van Toll, which is one of the first that appears in the spring, is generally very short-stalked, and the others in proportion to their earliness are shorter than those which succeed them; and the late-blowers are all considerably longer in their stems than any of the early-blowers.

"The late-blowing Tulips producing much finer flowers than the early ones, have engrossed almost the whole attention of the florists. It would be to little purpose to enumerate all the varieties, since there is scarcely any end of their numbers, and what some value at a considerable rate, others reject; and as there are annually many new flowers obtained from breeders, those which are old, if they have not very good properties to recommend them, are thrown out and despised."

It is observed that "modern florists in Holland and Flanders, and our English florists from them, boast a prodigious variety of late-blowing Tulips." And that "Mr. Maddock of Walworth, in his catalogue of flowers for 1792, has no less than about 665 of these admired beauties, all ranged under their proper families and colours, with their names and prices: besides the early sorts, *double tulips*, *parrot-tulips*, *French tulips*, and *breeders*."

It is added that "the late-blowers are distributed into five families: 1. *Primo Baguets*; very tall; fine cups with white bottoms, well broken with fine brown, and all from the same breeder: 2. *Baguet Rigauts*; not quite so tall, but with strong stems, and very large well-formed cups with white bottoms, well broken with fine brown, and all from the same breeder: 3. *Incomparable Verports*; a particular kind of *Bybloemens*, with most perfect cups, very fine white bottoms, well broken with shining brown, and all from the same breeder; some of these are from two to five guineas a root: 4. *Bybloemens*; with bottoms white, or nearly so, from different breeders, and broken with variety of colours; those of the Verports are cherry and rose: 5. *Bizarres*; ground yellow, from different breeders, and broken with variety of colours.—These barbarous terms, used by the Dutch florists, are, it is said, a mixture of Dutch and French. Baguet is from the French Baguette, a rod or wand, so named from its tall slender stem. Bizarre is also French; and the Tulips of that family have the name from the variety and irregularity of their colours. Rigauts are probably from the name of some eminent florist, Rigaud. The other terms are Dutch.—Breeders are of one colour, and when broken produce new varieties."

"The properties of a fine variegated late Tulip, according to the best modern florists, are," he says, "these: 1. the stem should be strong, upright, and tall, about thirty inches high: 2. the flower should be large, composed of six petals, proceeding a little horizontally at first, and then turning upwards so as to form an almost perfect cup, with a round bottom, rather wider at the top: 3. the three outer petals should be rather larger than the three inner ones, and broader at their base: all the petals should have the edges perfectly entire; the top of each should be broad and well rounded; the ground colour at the bottom of the cup should be clear white or yellow; and the various rich stripes which are the principal ornament of a fine flower should be regular, bold, and distinct on the margin, and terminate in fine broken points, elegantly feathered or pencilled: 4. the centre of each

VOL. II.

petal should contain one or more bold blotches or stripes, intermixed with small portions of the original colour, abruptly broken into many irregular obtuse points. Some florists," he adds, "are of opinion that the central stripes or blotches do not contribute to the beauty of the Tulip, unless they are confined to a narrow stripe exactly down the centre; and that they should be perfectly free from any remains of the original colour: it is certain that such flowers appear very beautiful and delicate, especially when they have a regular narrow feathering at the edge: but it is unanimously agreed, that the Tulip should abound in rich colouring, distributed in a distinct and regular manner throughout the flower, except in the bottom of the cup, which should indisputably be of a clear bright white or yellow, free from stain or tinge, in order to constitute a perfect flower. The Double and Parrot Tulips are," says he, "in no sort of esteem among the florists."

The second species has the bulb ovate, gibbous: the stem quite simple, nearly upright, round, smooth, leafy in the middle, attenuated at the base: the leaves alternate, slightly embracing, lanceolate, acute, keeled, glaucous: the flower always yellow, greenish on the outside: the petals elliptic-lanceolate, without any nectary: the filaments flattened: the anthers terminating, versatile, oblong: the germ three-cornered: stigma sessile, three-cornered. A native of the South of Europe, &c., flowering in April.

"It has most of these characters in common with the Garden species; but the circumstances that abundantly distinguish this are; the narrow leaves, the nodding flower, the hairiness at the base of the stamens and on the tips of the petals, and especially the simple obtuse form of the stigma, which is totally different from that of the Garden Tulip: the flower too is fragrant; the pollen yellow, not black; and the anthers remarkably long. In the *Flora Danica* they are represented short and round."

Culture.—All the different sorts of tulips may be increased by offsets from the roots, and by sowing seeds to produce new varieties. The offsets should be separated from the old roots in June, on taking them up when the flowering is over, planting them in nursery-beds, in rows six inches apart, and to the depth of three, four, or five, in the beginning of autumn. They may also in the old root, be planted in beds, or in the borders or other parts where they are to remain and blow, in patches of four or five, placed irregularly; and to have a succession, they may be planted at different times; they are usually planted with a blunt dibble: the new roots should always be planted by themselves.

The early and late sorts should likewise be each put in, in places by themselves, and it is advised that the roots of the early blowing kinds should be planted the beginning of September, in a warm border, near a wall, paling, or hedge; as, when they are put into an open spot of ground, their buds are in danger of suffering by morning frosts in the spring. The soil for these should be renewed every year, where people intend to have them fair. The best soil for this purpose is that which is taken from a light sandy pasture, with the turf rotted amongst it, and to this should be added a fourth part of sea sand. This mixture may be laid about ten inches deep, which will be sufficient for these roots, which need not be planted more than four or five inches deep at the most.

The offsets should not be planted amongst the blowing roots, but in a border by themselves, where they may be set pretty close together, especially when they are small; but these should be taken up when their leaves decay, in the same manner as the blowing roots, otherwise they would rot if the season should prove very wet, as they are not so hardy as the late blowers, nor do they increase half so fast, so that more care is requisite to preserve the offsets of them.

When these sorts come up in the spring, the earth upon the surface of the beds or borders should be gently stirred and cleared from weeds; and as the buds appear, if the season should prove very severe, it will be of great service to cover them with mats, for want of which, many times they are blighted, and their flowers decay before they blow, which is often injurious to the roots, as is also the cropping of the flowers soon after they are blown; as their roots, which are formed new every year, are not at that time arrived to their full magnitude, and are of course deprived of proper nourishment or support.

When these flowers are blown, if the season should prove very warm, it will be proper to shade them with mats, &c., in the heat of the day; and when the nights are frosty, they should be covered in the same manner, by which means they may be preserved a long time in beauty; but when their flowers are decayed, and their seed-vessels begin to swell, they should be broken off just at the top of the stalks, as when they are permitted to seed it injures the roots very greatly.

In these sorts when the leaves are decayed, which is usually before the late blowers are out of flower, their roots should be taken up, and spread upon mats in a shady place to dry; after which they should be cleared from filth, and put in a dry place where vermin cannot come to them, until the season for planting

them again, being very careful to preserve every sort separate, that it may be known how to dispose of them at the time of planting.

For this purpose, it is a good method to have large flat boxes made, which are divided into several parts by small partitions, each of which is numbered the same as the divisions of the beds; so that when a catalogue of the roots is made, and the numbers fixed to each sort in the beds, nothing more is necessary, in taking up the roots, but to put every kind into the division marked with the same number in the bed. This saves a great deal of trouble in making fresh marks every time the roots are taken up, and effectually answers the purpose of preserving the kinds separate and distinct.

In raising these plants from seed, it is, from the time of sowing, seven or eight years before they produce flowers; and after all, they at first appear only single-coloured, often requiring two, three, or more years longer before they break into different colours or variegations; so that the tediousness of raising seedling tulips to a flowering state often deters from the undertaking. It is, however, the method by which all the fine varieties were first obtained, and by which new varieties are still annually gained; as many persons sow some every year, in expectation that after the first six or seven years a new show of flowers will be produced, out of which many new varieties may annually discover themselves in each parcel. It is by this process the Dutch are so famous for furnishing such an infinity of fine varieties, supplying almost all other countries.

In effecting this business, great care should be used in the choice of the seed: the best is that which is saved from breeders which have all the good properties before related, for the seeds of striped flowers seldom produce any thing that is valuable; and the best method to obtain it is to make choice of a parcel of such breeding Tulip roots as are wished to save seeds from, and place them in a separate bed from the breeders, in a place where they may be fully exposed to the sun, planting them at least nine inches deep, as when they are planted too shallow their stems are apt to decay before their seed is perfectly ripened: the flowers should be always exposed to the weather, as when they are shaded with mats, or any other covering, it prevents their perfecting the seed. About the middle of July, according to the season, the seeds will be fit to gather, as shown by the dryness of their stalks and the opening of the seed-vessels, at which time they may be cut off, and the seeds be preserved in the pods till the season for sowing, being careful to put them up in a dry place, otherwise they will be subject to

mould, and be rendered useless. The beginning of September is the proper season for sowing the seed; for which there should be provided a parcel of shallow seed-pans, or boxes, which should have holes in their bottoms to let the moisture pass off; these should be filled with fresh sandy earth, laying the surface very even, upon which the seeds should be sown thinly as regularly as possible; some of the same light sandy earth being sifted over them, about half an inch thick. These boxes or pans should be placed where they may have the morning sun till eleven o'clock, in which situation they may remain until October, at which time they should be removed into a more open situation, where they may enjoy the benefit of the sun all the day, and be sheltered from the north winds, where they should remain during the winter season; but in the spring, when the plants appear with grassy leaves, they should be again removed to their first situation; and if the season be dry they must be refreshed with water while the plants remain green; but as soon as their tops begin to decay, no more should be given. The boxes should be placed in a shady situation during the summer season, but not under the drip of trees. The weeds and moss should be kept constantly cleared off from the surface of the earth in the boxes, and a little fresh earth be sifted over them soon after their leaves decay; and at Michaelmas they should be fresh earthed again, and as the winter comes on be again removed into the sun as before, and treated in the same manner, until the leaves decay in the spring, when the bulbs should be carefully taken up, and planted in beds of fresh sandy earth, which should have tiles laid under them, to prevent their roots from shooting downward, which they often do when there is nothing to stop them, and are destroyed. The earth of these beds may be about five inches thick upon the tiles, which will be sufficient for nourishing the roots while young. The distance of planting them need not be more than two inches, nor should they be planted above two inches deep. Toward the end of October, it will be proper to cover the beds over with a little fresh earth about an inch deep, which will preserve the roots from the frost, and prevent moss or weeds from growing over them; and when the winter is very severe, it may be proper to cover the bed either with mats or peas-baulm, to prevent the frost from entering the ground, as these roots are much tenderer while young, than after they have acquired strength. In the next spring the surface of the ground should be again gently stirred to make it clean, before the plants come up; and when the spring proves dry, they

must be frequently refreshed with water in small portions during the time of their growth; and when the leaves are decayed, the weeds should be taken off, and the beds covered with fresh earth, as before, which should also be repeated again in the autumn. When the bulbs have been managed in this way two years, they should in the summer following, when their leaves decay, the roots being by that time considerably improved in growth, be again taken up, and planted in a fresh prepared bed, in drills three or four inches asunder, in which to remain two years longer; then, at the decay of the leaf, be again planted out into fresh beds, in rows as before, where they should be let remain to blow, being afterwards ordered as the flowering bulbs. When they are in full flower, they should be examined, in order to mark such of them as discover the best properties, that they may be separated from the others at the proper lifting season, and be replanted in beds by themselves for breeders; removing them annually at the proper season into different beds of opposite or contrary soils, as one year in poor hungry earth, the next in a much richer mould; continuing them so till they break into variegations and stripes of different colours, which are the only modes by which it can be assisted. When the leaves and flower-stems are decayed and withered, and the roots have ceased growing and drawing nourishment from the earth, it is the proper period for lifting or taking the old roots out of the earth, to reserve them till autumn for planting, being preserved in the manner directed above.

The early dwarf sorts are the most proper for forcing for early blowing, and also for being placed in glasses, in rooms, &c.

The second species may be managed in the same manner. They are all highly ornamental flowers, from their much varied and most beautiful colours.

TURF, the green surface or sward cut from pastures, &c., for the purpose of laying down grass-grounds; as lawns, plats, bowling-greens, &c.

It is flayed with the turfing-iron, in regular lengths of two or three feet, and a foot wide; and being properly laid down close and regular in the places intended, it immediately forms an even grass sward, which quickly strikes root in the ground, in proper growth and verdure. This sort of work may be performed any time in autumn, winter, and spring, in open weather, or occasionally in summer, in a moist season, but the autumn is the best season. The best turf is mostly procured from fine close fed pastures, commons, or downs, &c., where the sward is close and even; or that of any grass

field of similar close firm sward, where the grass is not rank and coarse, nor abounding in weeds; or much overrun with the common wild daisy. but should this be omitted, the first heavy rain will mostly recover the whole effectually, and swell the sward, so as to close all the chasms, and revive the verdure of the grass plants, when

In the operation of cutting, a line should be drawn tight lengthways of the grass-ground, and then the cutting-racer be stricken into the surface of the sward, close to the line, pushing it along so as to cut or score the sward in a straight line, about an inch and half deep; and having thus raced out one length, the line should be moved a foot width further to race out another length as before, proceeding in the same manner to a third, and so on to as many lengths of the line, in foot widths, as the surface may be necessary; then, by the same means, the sward is to be raced cross-ways in yard distances, performed before the grass gets too high and thus the proper widths and lengths are formed. After the sward has been thus raced

half deep; and having thus raced out one length, the line should be moved a foot width further to race out another length as before, proceeding in the same manner to a third, and so on to as many lengths of the line, in foot widths, as the surface may be necessary; then, by the same means, the sward is to be raced cross-ways in yard distances, performed before the grass gets too high and thus the proper widths and lengths are formed. After the sward has been thus raced

out, it should be flayed, or cut up with the *TURFING-IRON*, an implement made use of for flaying or cutting up grass turf from land only longways the whole length of each raced. It is formed with an iron plate for the cutter, six to seven or eight inches following immediately after to roll them wide, a little rounding forward at the edge, half in yard lengths, grass side inward, which is thin and sharp for cutting, but thick and tight as possible; having thus cut one gradually behind to the upper part, where proceed with another in the same it is forged to a long bent iron handle, the bend continue with the whole. As they should be piled resting flat with its back on the ground, in the either, ready for carrying proper position for readily cutting or flaying the hundred, as is often turf evenly, all a regular depth; the handle at the top, for the fix a short wooden handle of that kind. It is represented at fig. 4. in the annexed plate. In using it in cutting the turf, the workman takes hold with one hand in the top handle, the other below, or with the latter guiding the tool in the proper position, whilst the upper hand is placed against his knee, &c., which assists him in thrusting it forward into the ground evenly under the sward; and thus he proceeds along in a regular manner, moving the tool gradually along at each level and even, at an equal depth.

KEY-BERRY TREE. See *CORDIA*.

KEY-WHEAT. See *ZEA*.

LAP. See *LILIVM*.

See *BRASSICA*.

genus comprising a plant of exotic kind, for the

and order *Pentandria*

the natural order of

calyx is a one-

alous: tube

der erect,

h of the

care in this part of the business, except occasionally beating down any swelling inequalities, and sometimes rolling it with a heavy iron roller. Sometimes when turf is laid in the summer, or early part of autumn, in dry hot weather, it will shrink and open considerably at the joinings, and assume a decayed-like appearance. In this case, a few good waterings would be serviceable; five-parted: segments lanceolate, length

T U R

tube: the corolla has five petals, obcordate, acuminate, flat, from upright spreading: claws narrow, inserted into the tube of the calyx: the stamina have five awl-shaped filaments, shorter than the corolla, inserted into the tube of the calyx: anthers acuminate, erect: the pistillum is a conical germ: styles three: filiform, length of the stamens: stigmas capillaceous-multifid: the pericarpium is an ovate capsule, one-celled, three-valved: receptacles annexed to the valves longitudinally, linear: the seeds numerous, oblong, obtuse.

The species cultivated is *T. ulmifolia*, Elm-leaved Turnera.

It has a shrubby stem, eight or ten feet high, sending out branches on every side the whole length: the leaves ovate-lanceolate, two inches and a half long, and an inch and half broad, rough on their upper side, and of a lucid green; their under side has many strong veins, and is of a lighter green, the edges are serrate: the flowers sit close upon the footstalks of the leaves, having two pretty large leafy appendages to the calyx: the corolla is large, and of a bright yellow. It is a native of the West Indies.

There is a variety with narrow leaves, which rises with a shrubby stalk to the height of eight or ten feet, with branches less slender and stiff

T W A

than in the broad-leaved sort: the leaves narrow-lanceolate, hairy, near three inches long, and about three quarters of an inch broad, terminating in acute points, obtusely serrate on their edges, and standing upon very short footstalks; when rubbed, they emit a disagreeable odour: the flowers are of a pale yellow: the petals large and oval, with the tails or claws twisted and joining: they are not so large or of so bright a yellow as in the true Elm-leaved sort. It is a native of Jamaica.

Culture.—These plants are easily raised from seed, which should be sown in the spring, in pots, and plunged in the bark-bed, or any other hot-bed, under glasses; and when the plants are come up two or three inches in height, they should be planted separately in small pots, plunging them in the stove of the bark-bed, to forward them a little in growth: they may afterwards be placed in any part of the stove, and be managed as other stove exotic plants. They are also capable of being increased by cuttings, planted in pots, and forwarded in the above manner. They afford a good variety among stove plants.

TURNSOLE. See CROTON.

TURPENTINE TREE. See PISTACIA.

TUTSAN. See HYPERICUM.

TWAY-BLADE. See OPHRYS.

U L E

ULEX, a genus furnishing shrubby plants of the thorny kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a two-leaved perianth, permanent: leaflets ovate-oblong, concave, straight, equal, a little shorter than the keel: upper leaflet two-toothed, lower three-toothed: the corolla papilionaceous, five-petalled: standard obcordate, emarginate, erect, very large: wings oblong, obtuse, shorter than the standard: keel two-petalled, straight, obtuse, converging by the lower margin: the stamina have diadelphous filaments, simple and nine-cleft: anthers simple: the pistillum is an oblong germ, cylindrical, hirsute: style filiform, rising: stigma obtuse, very small: the pericarpium is an oblong legume, turgid, scarcely longer than the calyx, straight, one-

U L E

celled, two-valved: the seeds few, roundish, emarginate.

The species cultivated are: 1. *U. Europæus*, Common Furze, Whin, or Gorse; 2. *U. nanus*, Dwarf Furze; 3. *U. Capensis*, Cape or African Furze.

The first is a well known shrub, which has its branches very close, deeply furrowed, woolly or hirsute, full of thorns, which are stretched out, branched, angular, very sharp, smooth, evergreen, leafy, frequently flower-bearing; according to Withering, awl-shaped, a little bowed downwards, woolly at the base, yellow at the ends: the leaves at the base of the spines and spinules, solitary, awl-shaped, terminating in sharp yellowish thorny points, somewhat rugged, often hirsute, deciduous: the peduncles axillary, single or two together, one-flowered, villose: the flowers of a fine yellow or gold colour. It is a native of Britain.

U R T

which are taper, stiff, and have a dark-green bark: the leaves about two inches and a quarter broad, dark-green above, and pale-green beneath, upon pretty long footstalks: the flowers axillary, solitary, sessile, shaped like those of the Mallow, but small and of a deep blush colour. It is a native of China, flowering here in July and August.

The second species has a suffruticose stem, upright, three feet high, with ascending branches: the leaves sinuate-palmate, with obtuse sinuses, serrate, rough, alternate, petioled, having a single glandular pore on the middle rib underneath: the flowers are rose-coloured, small, subsolitary, axillary. It is a native of the East Indies.

Culture.—These plants may be increased by seeds, which should be sown on a hot-bed, or in pots plunged into it, in the early spring season. When the plants have some growth, they should be removed into separate pots, being replunged in a fresh hot-bed, requiring afterwards the same management as tender exotic plants. When placed in the stove in the spring, they ripen seeds the first year, but otherwise in the second, and seldom continue longer.

They afford variety among other stove plants.

URTICA, a genus furnishing plants of the hardy herbaceous kind.

It belongs to the class and order *Monoecia Tetrandria*, and ranks in the natural order of *Scabridæ*.

The characters are: that in the male flowers the calyx is a four-leaved perianth: leaflets roundish, concave, obtuse: the corolla petals none: nectary in the centre of the flower, cup-shaped, entire, narrower below, very small: the stamina have four awl-shaped filaments, length of the calyx, spreading, each within each calyx-leaf: anthers two-celled: female flowers either on the same or a distinct plant: the calyx is a two-valved perianth, ovate, concave, erect, permanent: there is no corolla: the pistillum is

U R T

an ovate germ: style none: stigma villose: there is no pericarpium: calyx converging: the seed one, ovate, blunt, compressed, shining.

The species cultivated are: 1. *U. cannabina*, Hemp-leaved Nettle: 2. *U. Canadensis*, Canada Nettle: 3. *U. nivea*, Chinese or White-leaved Nettle.

The first has a perennial root: the stems five or six feet high: the leaves oblong, deeply cut into three lobes, which are acutely indented on their edges, and placed on long petioles: the flowers axillary in long cylindrical catkins: males on the lower part, females on the upper. It is a native of Siberia, flowering in July.

The second species has also a perennial root: the stems two feet high: the flowers in axillary branching aments; appearing towards autumn, but seldom followed by seeds in this climate. It is at first male only, but afterwards has male and female flowers on the same plant. It is a native of Canada and Virginia.

The third is a perennial plant, sending up many stalks from the root, which rise three or four feet high: the leaves are four inches long, and two inches and a half broad, serrate, of a deep green on their upper side, but very white on their under; having five longitudinal veins; they stand upon very long footstalks: the flowers axillary in loose aments, and not succeeded by seeds in this climate. It is a native of the East Indies.

Culture.—These plants may be increased by parting or slipping the roots in the autumn or early in the spring, and planting them out where they are to remain.

The third sort is rather tender, and should have a dry situation where it is warm and sheltered, or be kept in pots to be sheltered under frames, or in the green-house, during the severity of the winter season.

The two first sorts afford variety in the borders and clumps of pleasure grounds, and the last among potted plants.

V A L

VALERIANA, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that there is scarcely any calyx; a superior margin: the corolla a nectariferous tube on the lower side, gibbous: border five-cleft: segments obtuse: the stamina three,

VOL. II.

V A L

or fewer (in one species four): filaments awl-shaped, erect, length of the corolla: anthers roundish: the pistillum is an inferior germ: style filiform, length of the stamens: stigma thickish: the pericarpium a crust not opening, deciduous, crowned: the seeds solitary, oblong.

The species cultivated are: 1. *V. rubra*, Common or Broad-leaved Red Valerian; 2. *V. angustifolia*, Narrow-leaved Red Valerian; 3. *V.*

3 R.

Calcitrapa, Cut-leaved Valerian: 4. *V. Phu*, Garden Valerian; 5. *V. tripteris*, Three-leaved Valerian; 6. *V. montana*, Mountain Valerian; 7. *V. Celtica*, Celtic Valerian; 8. *V. tuberosa*, Tuberous-rooted Valerian; 9. *V. Pyrenaica*, Pyrenean Valerian; 10. *V. olitoria*, Common Corn-Salad, or Lamb's Lettuce.

The first has woody perennial roots, as thick as a man's finger, spreading very wide: the stems about three feet high, round, smooth, grayish, hollow: at each joint are two (sometimes three) smooth, spear-shaped leaves, near three inches long, and an inch broad; the upper part sends out branches by pairs, which, with the principal stem, are terminated by red flowers growing in corymbs. It is a native of France, Switzerland, Italy, &c. flowering all the summer and autumn.

The second species has the root not so large as in the first sort: the stems two feet high or more, branching on each side from the root to within six inches of the top: the leaves three or four inches long, but as narrow as those of flax: the upper part of the stem naked, and terminated by a compact corymb of bright red flowers, smaller than those of the former. It is a native of the mountains of France, Switzerland, &c.

The third is an annual plant: the lower leaves, which spread on the ground, are cut into many obtuse segments: the stalks, when the plants are in good ground, rise near a foot and half high, but upon dry stony soils not half so high, and when they grow out of the joints of old walls, not more than three inches in height; are hollow, smooth, and round, sending out branches by pairs from the upper joints: the segments of the pinnatifid leaves are very narrow: stem and branches terminated by tufts (corymbs) of flowers shaped like those of the fourth sort, but smaller and tinged with flesh-colour at the top. It is a native of the South of France, &c. flowering early in the spring.

It varies with the lower leaves pinnatifid.

The fourth species has thick roots, fleshy, jointed, spreading near the surface in a very irregular manner, crossing each other, and matting together by their small fibres: many of the root-leaves entire, others divided into three, five, or seven, obtuse lobes, of a pale green and quite smooth: the stems three or four feet high, hollow, sending out lateral branches by pairs: the stem-leaves opposite at each joint, composed of four or five pairs of long narrow leaflets, terminated by an odd one: the stem and branches terminated by corymbs of small white flowers. It is a native of Silesia, Barbary, &c. flowering from May to July, with the odour of the flowers very pleasant.

The fifth has a perennial root, long, unequal, brownish, strong-smelling: the root-leaves oblong-cordate, bluntish, smooth, obtusely serrate-toothed, on long petioles; the two first of these that come out are more inclined to roundish, and are only slightly crenate: the stem upright, undivided, about a foot high: the stem-leaves two or three pairs, smooth, ternate, on short petioles: leaflets confluent at the base, lanceolate, acute, unequally subserrate, the middle one larger than the others; they vary much, being gash-serrate, crenate, or even quite entire; the uppermost are sometimes lanceolate-linear and quite entire, sometimes pinnate with five leaflets: the flowers numerous, white, in loose corymbs. It is a native of the Alps of Switzerland, flowering here from March to May.

The sixth species agrees in stature and habit with the preceding; but this is more tufted, and has the root commonly creeping horizontally, more divided, and not smelling so strongly: all the leaves are acute, unequally serrate or toothed and smooth; the root-leaves are on long petioles, and more or less attenuated at the base towards the petiole: the stem-leaves vary in number, are on short petioles, and rather oblong: the stem is upright, simple, a foot or eighteen inches high: the flowers in a corymb, whitish or purplish. It is a native of Switzerland, Austria, &c. flowering here in June and July.

The seventh species has a perennial root, black, oblique, with long fibres, smelling very strong, aromatic, caulk cent at top and scaly with the remains of the deciduous leaves; it is often in tufts with an upright stem, four or five inches high: all the leaves are quite entire and obtuse; the root-leaves subovate, and attenuated into the petiole at the base; stem-leaves two, opposite, linear and sessile, about the middle of the stem, but there are sometimes none: the stem slender, simple, terminated by a few small whitish flowers in a corymb. It is found in Switzerland, flowering in June.

The eighth species has roots perennial, and tuberous, by which it is easily distinguished. It is a native of the South of Europe, flowering in May and June.

There is a variety with the roots in the form of an olive.

The ninth species has a perennial fibrous root, from which come out many heart-shaped leaves, on petioles more than a foot in length; they are four inches over each way, bluntly serrate, smooth, and of a bright green on their upper surface, but pale and a little hairy underneath: the stalks rise three feet high, are hollow, channelled, and send out opposite branches towards the top: the stem-leaves opposite,



Painted by J. A. Edwards

London Published Aug 1st 1808 by W. Kearsley Fleet Street

Engraved by F. Sander

Valeriana rubra
1 Red Valerian

Veronica Sibirica
2 Siberian Speedwell

shaped like the lower ones, but a little pointed; and frequently at the top there are ternate leaves standing upon short foot-stalks: the stem and branches are terminated by umbels of pale flesh-coloured flowers, having very short spurs. It flowers in June, and is a native of the Pyrenees.

The tenth has a small annual, fibrous, pale brown root: the stem dichotomous, somewhat spreading, from four inches to a span, and even a foot or more in height (in gardens); round, grooved, or angular, tender, often tinged with purple on one side: the leaves glaucous, pale, obovate-lanceolate or rather linear-tongue-shaped: the bottom leaves many, usually entire, but sometimes very slightly toothed near the base, somewhat spreading, rather succulent, smooth, veiny, and a little wrinkled, from three-quarters of an inch to two inches in length: the stem-leaves opposite at each subdivision, sessile, remote, usually more toothed than the bottom leaves: both these and the stem are ciliate or fringed at the edge with fine white hairs: the flowers are very small, of a pale blueish colour, and collected into a close little corymb, protected by an involucre. It is a native of Europe and Barbary, flowering in April and May. It is used in salads in the early spring and winter, under the name of Corn Salad, or Lamb's Lettuce.

There is a variety, which is smaller, with jagged leaves.

Culture.—The two first sorts may be increased by parting the roots, and planting them out in the autumn or spring season where they are to grow.

They may also be raised from seed sown at the same times, in the situations where the plants are to grow.

The third may likewise be raised from seeds, by sowing them as above, without any trouble.

The fourth may be increased by parting the roots, and planting them out in the autumn on fresh ground where they are to grow.

The fifth may be raised in the same way, being allowed good room as it spreads.

The three following sorts are more difficult to preserve, requiring a stony soil and cold exposure.

The ninth sort may be raised from seeds sown in a moist shady border soon after they are ripe, managing the plants as in the first sort.

The last sort, when cultivated for the purpose of salads, should be sown in the latter end of summer, or beginning of autumn, in an open place where it is to grow; the plants being afterwards thinned out by hoeing, and kept clean from weeds; when they will be fit for use very early in the spring while quite young.

All the sorts except the last may be introduced in the borders for the purpose of variety, and most of them continue many years.

The last is used as an early spring salad herb.

VENUS'S COMB. See SCANDIX.

VENUS'S FLY-TRAP. See DIONÆA.

VENUS'S LOOKING-GLASS. See CAM-PANULA.

VENUS'S NAVEL-WORT. See CYNOSGLOSSUM.

VERATRUM, a genus containing plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Coronariæ*.

The characters are: that in the hermaphrodite there is no calyx, unless the corolla be considered as such: the corolla has six petals, oblong, lanceolate, thinner at the edge, serrate, permanent: the stamina have six awl-shaped filaments, pressing the germs, more spreading at the tips, shorter by half than the corolla: anthers quadrangular: the pistillum has three erect germs, oblong, ending in scarcely apparent styles: stigmas simple, patulous: the pericarpium three capsules, oblong, erect, compressed, one-celled, one-valved, gaping inwards: the seeds many, oblong, blunter at one end, compressed, membranaceous, fastened in a double row: male flower on the same plant, below the hermaphrodite—the calyx, corolla, and stamina, as in the hermaphrodite: the pistillum an indistinct, vain rudiment.

The species cultivated are: 1. *V. album*, White-flowered Veratrum, or White Hellebore; 2. *V. nigrum*, Dark-flowered Veratrum; 3. *V. luteum*, Yellow-flowered Veratrum.

The first has a perennial root, composed of many thick fibres gathered into a head: the leaves oblong-ovate, ten inches long, and five broad in the middle, rounded at the end, and having many longitudinal plaits: the stems three or four feet high, branching out on every side almost their whole length: under each of these branches is placed a narrow plaited leaf, and these diminish in size as they are near the top of the stem: the branches and principal stem are terminated by spikes of flowers set very close together, of a greenish white or herbaceous colour; appearing in July. It is a native of Greece.

The second species has a perennial root like the first sort: the leaves are longer and thinner, plaited in like manner, but are of a yellowish green colour, and appear sooner in the spring: the stalks also rise higher: it has fewer leaves, and does not branch out into so many spikes: the flowers are of a dark red colour, with the petals spread open flat; appearing almost a

month sooner. It is a native of Austria and Siberia.

The third has a large tuberous root: the leaves oblong, having several longitudinal furrows, or plaits; they are four or five inches long, and two broad in the middle, and spread themselves on the ground; between these comes out a single stem, near a foot high, having a very few small leaves or sheaths placed on it alternately: the flowers are produced at the top, in a single thick close spike; are small, and of a yellowish white colour, appearing in June. It is a native of North America.

Culture.—These plants may be increased by seed and parting the roots.

The seed should be sown in the autumn or early spring upon a bed or border of light earth, or in a box filled with the same sort of mould. When the plants are come up in the spring keep them clear from weeds, and refreshed with water occasionally when the season is hot and dry; and in the following autumn, when the leaves decay, take them up carefully without injuring the roots, and plant them out about half a foot square in a fresh bed of light mould; and when they have remained in it till fit for flowering, they should be removed into the borders, clumps, or other parts. This is however a tedious method, as they seldom flower in less than four years; therefore the root method is mostly had recourse to.

The roots may be divided in autumn when the leaves decay, and be planted out in a light fresh rich mould where they are to grow; they should not be removed oftener than once in about four years. The roots should not be parted too small.

These plants have a fine effect in the middle of large borders, clumps, and other similar situations.

VERBASCUM, a genus furnishing plants of the hardy annual, biennial, and perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Luridæ*.

The characters are: that the calyx is a one-leaved perianth, five-parted, small, permanent: segments erect, acute: the corolla one-petalled, wheel-shaped, a little unequal: tube cylindric, very short: border spreading, five-parted: segments ovate, obtuse: the stamina have five filaments, awl-shaped, shorter than the corolla: anthers roundish, compressed, erect: the pistillum is a roundish germ: style filiform, length of the stamens, inclined: stigma thickish, obtuse: the pericarpium is a roundish capsule, two-celled, two-valved, opening at top: receptacles half ovate, fastened to the partition: the seeds numerous, angular.

The species cultivated are: 1. *V. Boerhaavii*, Annual Mullein; 2. *V. Blattaria*, Moth Mullein; 3. *V. Thapsus*, Great Mullein; 4. *V. phlomoides*, Woolly Mullein; 5. *V. Lychnitis*, White Mullein; 6. *V. sinuatum*, Scollop-leaved Mullein; 7. *V. ferrugineum*, Rusty Mullein; 8. *V. Phoeniceum*, Purple Mullein; 9. *V. Myconi*, Borage-leaved Mullein.

The first has an annual root: the stem from three to four feet high: the leaves sessile but not decurrent, spatulate, narrower at the base, sinuate but scarcely lyrate, almost naked above, somewhat tomentose beneath: the spike loose, terminating, with the flowers sessile, not crowded very much together, but several to each bracte: the corollas are yellow, with the stamens and pistils purple: the flowers have an agreeable scent at a little distance; but if smelt to long, or too near, it becomes less pleasant; they appear in June and July. It is a native of the South of Europe.

The second species has an annual fusiform root: the stem about three feet high, erect, branched, leafy, angular, smooth: the leaves obovate-oblong, doubly-serrate, smooth, embracing: root-leaves sublyrate: the racemes terminating, glandular-hairy, stiff, many-flowered: the flowers peduncled, solitary, yellow streaked more or less with purple, having each a single ovate bracte at the base of the peduncle. It is a native of the South of Europe, Germany, Switzerland, &c.; and is very ornamental, flowering from July to November, or even later in mild weather.

The third has a biennial root, spindle-shaped: the stem erect, simple, stiff, and straight, from three to five feet high, leafy, woolly, angular, winged: the leaves alternate, decurrent, oblong, nearly entire, very thickly clothed on both sides with white branched intricate villose hairs: the spike terminating, erect, cylindrical, many-flowered: the flowers sessile, closely set, bright yellow, sometimes but rarely white. It is a native of Europe and Siberia, flowering in July and August.

The fourth species has a biennial root: the stem erect, spiked, very tomentose: the leaves ovate, not at all cordate, crenate; the lower ones on a petiole which is flat above; the upper ones sessile, half embracing but not decurrent: the raceme spike-shaped, with scattered lanceolate bractes; within each of which are four flowers, the middle ones blowing first, then the lowest, and lastly the two lateral ones. It is a native of Italy, Germany, and the South of France; flowering in June and July.

The fifth has a biennial root: the stem erect, seldom more than three feet high, stiff and

straight, angular, woolly, leafy, terminating in a panicle very much branched: the leaves elliptic-oblong, somewhat wedge-shaped, crenate, closely woolly beneath, but nearly smooth on the upper-side, netted-veined; the radical ones attenuated at the base: the stem-leaves ovate, sessile, but not decurrent: the branches of the panicle racemed, many-flowered: the flowers pedicelled, in bundles, cream-coloured with yellow filaments and saffron-coloured anthers. It is remarkable for its straight wand-like angular stem and cream-coloured flowers, which are produced in great numbers in a compound clustered terminating raceme. It is a native of Europe.

The sixth species has a biennial root: the radical leaves repand, or obtusely sinuate-pinnatifid: stem-leaves oblong, waved, decurrent a little at the base on each side: branch leaves ovate or cordate, a little decurrent; the first of these are opposite, the rest alternate: the flowers sessile, glomerate, in an interrupted spike. It is a native of the South of France, Italy and Barbary; flowering in July and August.

The seventh has a perennial root: the bottom leaves are ovate-oblong, indistinctly crenate, (doubly crenate,) dark green above, pale green beneath, standing upon pretty long footstalks: the stalk rises three or four feet high, branching out on each side, and has a few sharp-pointed small leaves on the lower part, sitting close to the stalk: the flowers are disposed in a long loose spike on the upper part of the stalk; they come out upon short slender pedicels, three or four from the lower joints; above these there are two at each joint, and at the top they are single; they are of a rusty iron colour, and larger than those of the common sort; they appear in July and August. It is a native of the South of Europe.

The eighth species has also a biennial root: the radical leaves ovate, subsessile, naked, even, wrinkled, scarcely crenate: the stem erect, simple, two feet high: the branches from the lowest axils, erect, simple, length of the stem, all angular, subpubescent with hairs clammy at the tip: the stem leaves cordate, sessile, smooth, wrinkled and veined: the raceme of all terminating, simple, a foot long: the peduncles simple, solitary, one-flowered. It is a native of the South of Europe.

The ninth has a perennial root, composed of slender fibres: the leaves, which spread flat on the ground, are of a thick fleshy substance, of an ovate shape, indented on their edges, woolly, and of a dark green colour; they are sessile or subsessile, embrace the crown of the root, and lie over each other; they continue in verdure all the year, but in winter change to a much darker

green: from among these leaves arise several scapes or naked slender stalks, about four inches high, which divide into three or four pedicels at the top, hairy and of a brown-purplish colour, each sustaining one large flower, of a fine blue, so deeply divided as to appear to be five-petalled: the segments are oval, obtuse, and spread open flat, like the Auricula: the flowers are large in proportion to the size of the plant, of a blueish purple colour, and highly ornamental, appearing in May, and continue successively in blossom for several months. It is a desirable plant to cultivate, especially for decorating rock-work. It is a native of the Pyrenees.

Culture.—These plants may all be increased by seeds, and offsets taken from the roots.

The well ripened seeds should be sown in the autumn or early spring in a bed of light mould, or in the borders or other parts where they are to remain, covering them lightly in. When the plants are up a few inches in height, in the bed method, they should be removed into nursery-rows till the autumn, when they must be removed to where they are to remain.

The annual sort is however best sown at once where the plants are to grow, which is best done in patches.

The offsets of all the perennial sorts should be taken off in the autumn, or very early in the spring, and be planted out where they are to grow. This is better than afterwards transplanting them.

They are all hardy plants, that succeed in almost any soil.

They afford a good effect in their different foliage, and sweet scent of their flowers, in the large borders, clumps, and other parts of pleasure grounds; the larger sorts being placed backwards in them.

VERBENA, a genus containing plants of the hardy herbaceous and tender exotic kinds.

It belongs to the class and order *Diandria Monogynia*, (*Didynamia Gymnospermia*), and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved perianth, angular, tubular, linear, five-toothed, the fifth toothlet truncate, permanent: the corolla is one-petalled, unequal: tube cylindrical, straight for the length of the calyx, then widening and curved in: border spreading, half five-cleft: segments rounded, almost equal: the stamina have two or four filaments, bristle-shaped, very short, lying within the tube of the corolla; two of them shorter (when there are four:) anthers curved in, as many as there are filaments: the pistillum is a four-cornered germ: style simple, filiform, length of the tube: stigma obtuse: the pericarpium is very slender, and scarcely manifest, or almost none: calyx con-

taining the seeds: the seeds two or four, oblong.

The species cultivated are: 1. *V. Indica*, Indian Vervain; 2. *V. supina*, Trailing Vervain; 3. *V. orubica*, Betony-leaved Vervain; 4. *V. Jamaicensis*, Jamaica Vervain; 5. *V. Mexicana*, Mexican Vervain; 6. *V. globiflora*, Globe-flowered Vervain; 7. *V. bonariensis*, Cluster-flowered Vervain; 8. *V. hastata*, Halberd-leaved Vervain; 9. *V. triphylla*, Three-leaved Vervain.

There are many other species that may be cultivated for variety.

The first is an annual plant, very much resembling the fourth sort, but easily distinguished from it by the stem and branches being smooth, except the base of the leaves and the part of the branches between the leaves, which are ciliate: the leaves also are much narrower, being truly lanceolate and drawn to a point at both ends: the spike is the same, but the colour of the corolla is purple. It is a native of Ceylon, flowering in August.

The second species has a biennial root (annual): the stalks near two feet high, branching out greatly: the leaves sessile: the flowers disposed in long loose spikes singly at the end of the branches; they are of a light blue colour, and large. It flowers in July and August, and is a native of Spain, Portugal and Algiers.

The third arises with a shrubby stalk near three feet high, divided into three or four branches: the leaves oblong-ovate, placed by pairs, deeply serrate, deep green above, but hoary beneath; their footstalks are short, and have leafy borders running from the base of the leaves: the flowers grow in thick terminating spikes about a foot in length; are large, of a fine blue colour, and have small acute-pointed leaves intermixed with them; they come out in June and July. It is biennial, and a native of South America.

The fourth species has the stem three or four feet high, very much branched and diffused, and being suffrutescent at the base it seems to be more than annual: the stem and branches rough with hair: the leaves opposite, ovate, obtuse or acute, serrate, gradually and for a considerable length attenuated at the base: from the axil between two opposite branches comes forth a fleshy spike, a foot long, unequally cylindrical, stiff and green: the flowers blow in succession, beginning at the bottom, very few together, violet-coloured, with the throat and long slender incurved tube white. It is a native of Jamaica, Barbadoes, &c.

The fifth has a shrubby stalk, which rises five or six feet high, and divides into several branches: the leaves sessile, oblong, serrate, ending in acute points, two inches long, one

inch broad near the base, of a light green colour on both sides: the branches are terminated by slender loose spikes of small pale flowers, the calyxes of which afterwards become swelled and almost globular; are reflexed, and set with stinging hairs. It is a native of Mexico, flowering in July and August.

The sixth species is a fragrant shrub: the stem erect, branched, ash-coloured, the height of a man: the branches erect, round, like the stem: the branchlets rugged, pithy, bay-coloured: the shoots villose, rugged, from four-cornered round, green at top: the leaves opposite, seldom three together, spreading, sharp at both ends, crenate or bluntly serrate, except at the base, where they are entire, attenuated into the petiole, marked with lines above, and with erect, alternate, prominent nerves beneath, very much veined, wrinkled, villose, rugged, reclining, permanent, fragrant: petioles shorter than the leaf, round on one side, grooved or flat on the other, villose, edged with the decurrent leaf: heads terminating, axillary, peduncled, roundish, bracted, imbricate: the peduncles erect, single or two from each axil, scarcely longer than half the leaf, villose, rugged: the flowers sessile, one to each bracte, very close, compressed, white. It is a native of South America.

The seventh has four-cornered stalks which rise to the height of five or six feet, sending out side branches by pairs: the leaves three inches long, and about three quarters of an inch broad, of a pale green colour, and serrate: the spikes terminating, clustered, the longest about two inches, the others about half as long: the flowers blue, appearing late in summer. It is a native of Buenos Ayres.

The eighth species sends up many four-cornered furrowed stalks from the root, which rise five or six feet high: the leaves opposite, oblong, about three inches long, and an inch broad near the base, ending in acute points, deeply serrate on slender petioles: from the same joints come out short branches, set with smaller leaves of the same form: the stalks are terminated by spikes of blue flowers in clusters, which appear in August. It is a native of Canada.

The ninth is a very sweet-smelling under-shrub: the stem upright, branched, round, ash-coloured, a fathom in height: the branches three or four in a whorl, spreading very much, rugged: the branchlets six-cornered, bay-coloured: the leaves generally three together, sometimes four, spreading, of a bright green colour, and very pleasant smell like that of the lemon: the flowers in an erect terminating panicle, composed of spikes.

Culture.—These plants are not raised without

difficulty and attention. They may be increased by seeds, which should be sown in pots, or on a hot-bed, in the early spring, plunging the pots in the bed. When they are in a state of growth to remove, they should be planted in separate pots and replunged in a fresh hot-bed, shade being given till they have taken new root, when they must have the management of tender plants of the exotic kind. The annual sorts should be kept in the stove, or a glass case, where there is a bark-bed to plunge them in when too large to be continued under the frames; and the perennial sorts may be placed simply in such cases, air being admitted in a cautious manner.

Of these kinds, such as do not afford good seeds in this climate, may be increased by planting cuttings in the summer months in pots of good mould, placing them in the bark-bed of the stove, where they may be preserved many years.

The eighth sort may be raised from seeds by sowing them in the autumn, and by parting the roots and planting them out at the same time. They succeed best on a soft loamy soil, and are so hardy as to thrive in the open air.

The ninth sort may be readily increased by planting cuttings in the spring or autumn in pots of good mould. It should have the protection of the green-house or a glass case.

They afford variety among other potted plants in the green-house and stove, and some of the hardy sorts occasionally in the open ground.

VERBESINA, a genus affording plants of the herbaceous and woody flowering exotic kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Oppositifoliæ*.

The characters of which are: that the calyx is common concave: leaflets oblong, channelled-concave, erect, commonly equal, in a double row: the corolla compound radiate: corollets hermaphrodite, many, in the disk: females about five in the ray: proper of the hermaphrodite funnel-form, five-toothed, erect:—female ligulate, trifid and wide or simple and very narrow: the stamina in the hermaphrodites: filaments five, capillary, very short: anthers cylindrical, tubular:—the pistillum of the hermaphrodite: germ somewhat oblong: style filiform, length of the stamens: stigmas two, reflexed:—in the females, germ somewhat oblong: style filiform, length of the hermaphrodite: stigmas two, reflexed: there is no pericarpium: calyx unchanged: the seeds in the hermaphrodites solitary, thickish, angular: pappus of two awl-shaped unequal awns: in the females very like the others: the receptacle chaffy.

The species cultivated are: 1. *V. alata*, Wing-stalked Verbesina; 2. *V. Chinensis*, Chinese

Verbesina; 3. *V. nodiflora*, Sessile-flowered Verbesina; 4. *V. fruticosa*, Shrubby Verbesina; 5. *V. gigantea*, Tree Verbesina.

The first is an herbaceous plant, with an upright stem about two feet high, subdivided, round, winged, rough-haired: the branches alternate, erect, axillary: the leaves oblong, acuminate, angular-toothed, nerved, somewhat rugged, rough-haired: the stem has four wings formed by the leaves running down it: the peduncles elongated, terminating, pubescent, with flowers in single heads, of a deep orange-colour. It is perennial, and a native of South America, flowering most part of the summer.

The second species is a shrub with a single, round, submentose stem and undivided branches from the upper axils of the leaves; which are somewhat tomentose, bluntish, petioled: the flowers terminating, solitary, peduncled, and yellow.

The third has an annual root: the stem herbaceous, branched, a foot high, round, even: the leaves sessile, mostly terminating, cuneate-ovate, acuminate, nerved, hispid: the flowers sessile in the axils of the terminating leaves, two or three together, yellow, appearing in July. It is a native of the West Indies.

The fourth species rises with a shrubby stalk seven or eight feet high: the leaves deeply serrate and cut somewhat like those of the evergreen oak: the flowers are yellow, produced from the side of the stalks, and appear in July. It is a native of the West Indies.

The fifth has the stem fifteen feet high, and the thickness of a thumb at the lower part, smooth, green, and viscid; it is filled without interruption by a white inodorous pith, as in a rush; is simple, or at least but very slightly divided at top: and the whole stem is aphyllous, the leaves occupying only the upper part and branchlets: they are alternate, foot-stalked, and the largest are about a foot and a half long; they are villose and pinnatifid, with distant oblong lobes: from the bosoms of the upper leaves spring round whitish-villose peduncles, bearing at their tips the flowers, which are slightly foot-stalked, and closely heaped together, forming a kind of panicle: the corollets are white, and the anthers black. It is a native of the West Indies.

Culture.—These plants may be increased by sowing the seeds upon a moderate hot-bed, or in pots plunged into it, in the early spring months, and when the plants are of sufficient growth they should be removed into separate pots, or into a new hot-bed, giving shade till they become new-rooted; afterwards managing them as tender annual plants, being careful not to draw them up weak: about the middle of sum-

mer they may be taken up with balls to their roots, and be planted in a warm sheltered border, being protected and watered till re-rooted, little care being afterwards necessary: these produce seeds often in the autumn; but in the stove they may frequently be preserved over the winter.

They produce variety in stove- and greenhouse collections, and sometimes in the borders during the summer season.

VERONICA, a genus comprising plants of the herbaceous perennial and shrubby kinds.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a four-parted perianth, permanent: segments lanceolate, acute: the corolla one-petalled, wheel-shaped: tube length almost of the calyx: border four-parted, flat, with ovate segments; the lowest narrower, the segment opposite to this wider: the stamens have two filaments, narrower at bottom, ascending: anthers oblong: the pistillum is a compressed germ: style filiform, length of the stamens, declined: stigma simple: the pericarpium is an obcordate capsule, compressed at the top, two-celled, four-valved: the seeds numerous, roundish.

The species cultivated are: 1. *V. Sibirica*, Siberian Speedwell; 2. *V. Virginica*, Virginian Speedwell; 3. *V. spuria*, Bastard Speedwell; 4. *V. maritima*, Sea Speedwell; 5. *V. longifolia*, Long-leaved Speedwell; 6. *V. hybrida*, Welsh Speedwell; 7. *V. incisa*, Cut-leaved Speedwell; 8. *V. decussata*, Cross-leaved Speedwell.

The first has a perennial root: the stem four feet high, rough-haired: the leaves six or seven in whorls, twice as wide as those of the second sort: peduncles terminating solitary; the lateral ones with two opposite oval leaflets: the calyxes five-cleft: the corollets blue, with an oblong tube, and small acute border: the stamens and pistil twice as long as the corolla. It is a native of Siberia, flowering in July and August.

The second species has the stems erect, four or five feet high, having four or five lanceolate leaves in whorls at each joint, serrate, and ending in acute points: the stems are terminated by long slender spikes of white flowers, which appear late in July. It is a native of Virginia and Japan.

It varies with blush-coloured flowers.

The third has a perennial root, sending out many offsets: the lower leaves two inches long, and half an inch broad, pale green and hairy: the stems a foot high, with very narrow lanceolate leaves, placed opposite, and having a few slight serratures on their edges: the stems terminated by long spikes of blue flowers, which

appear in June and July. It is a native of Siberia and Germany.

There is a variety of this also with a flesh-coloured flower.

The fourth species has the stalks not so long as those of the preceding: the leaves by fours and threes round the stalk, on longer footstalks; they are broader at the base, run out into long acute points, are unequally serrate, and of a bright green colour: the flowers are of a bright blue, and appear in July. It is a native of the sea-coasts of Europe.

There are varieties with leaves opposite, in threes or in fours, with blue, blueish, flesh-coloured, and with white flowers.

The fifth has the lower leaves two inches long, and an inch broad in the middle, drawing to a point at each end, serrate, and of a lucid green colour: the stems a foot and a half high, with leaves of the same shape but smaller, and placed opposite; they are terminated by long spikes of blue flowers, which appear in June. It is a native of Germany, Austria, and Russia.

The sixth species has the stems very white and woolly, about a foot high: the leaves oblong, hoary, two inches and a half long, three quarters of an inch broad, sessile: the flowers deep blue in terminating spikes, and from the upper axils: they appear in June and July. It is a native of Russia, Ukrain Tartary, &c.

There is a variety with white flowers.

The seventh has the spikes aggregate, the flowers large, the leaves an inch long, lanceolate wedge-shaped at the base, with lanceolate segments. It is a native of Siberia, flowering in July and August.

The eighth species is a bushy shrub about two feet high: stem upright, round, very much branched: the branchlets alternate, spreading, round or indistinctly quadrangular, closely leaved on every side, having a pubescent line on each side running down from the oppositions of the leaves, which spread very much, are scarce an inch long, acute, coriaceous, smooth and even, one-nerved, paler underneath, evergreen, border cartilaginous, on very short concave smooth petioles, gibbous at the base on the outside: the racemes single, short, few-flowered, towards the end of the branches, not terminating, but just below the top: the pedicels alternate, short, quadrangular, one-flowered. The regular growth of the leaves, decussated or crosswise, distinguishes this species immediately.

Culture.—These plants may be raised by seed and parting the roots.

In the annual sorts the seeds should be sown in the autumn or very early spring, in the borders or places where the plants are to grow, be-

ing lightly covered in : if the seeds be permitted to scatter, good plants may be raised : sometimes they are sown on beds to be afterwards removed.

In the perennial sorts the roots may be parted in the autumn or early spring, and planted out where they are to grow, or in nursery-rows to be afterwards removed.

They should not be parted too small, or oftener than every two years : the large-growing sorts are proper for the borders, clumps, &c. and the trailing kinds for banks and shady slopes, or other similar places : they are hardy, and require only to be kept clean afterwards.

The eighth sort is readily increased by cuttings in the spring and summer, being managed as a hardy greenhouse plant in the same way as the Myrtle.

In very mild winters it sometimes stands secure in the open air.

The annual and perennial sorts afford variety in the borders, clumps, and other parts of pleasure-grounds, and the last among plants of the hardy potted green-house kinds.

VERMIN, a term applied to various small animals that are injurious to garden crops.

Rats and Mice are of this kind, and do much mischief in sheds and other places, where they frequently destroy beans, pease, and other seeds : they should therefore be extirpated as much as possible.

And there are different modes of destroying them ; as by traps, poison, &c. But Mr. Forsyth advises never to use arsenic, or corrosive sublimate, for that purpose, except under particular circumstances, as they are deadly poison : nux vomica will, he thinks, generally answer the end as well, without the danger. He has suggested it as a very good plan to prevent accidents, to "enclose the traps in cases, having holes in the ends of them large enough to admit rats, but small enough to exclude dogs, cats, &c."

The following is recommended as a bait for rat-traps. "Take a pound of good flour, three ounces of treacle, and six drops of the oil of caraways : put them all in a dish, and rub them well together till they are properly mixed ; then add a pound of crumb of bread. The traps baited with this mixture should be set as near their haunts as possible ; but, for two or three days, so as not to fall or strike on the rats going in, but letting them have free liberty to go in and out at pleasure, as this makes them fearless. Some of the bait should also be laid at the rat-holes, and a little of it scattered quite up to the traps, and so on to the bridge of each trap, where a handful may be placed." It may also, he says, "be proper to scent the traps with the

VOL. II.

following mixture, for the purpose of enticing the rats into them.

"Take twenty drops of oil of rhodium, six or seven grains of musk, and half an ounce of oil of aniseed ; put them in a small phial, and shake it well before using ; then dip a bit of twisted paper, or rag, in the mixture, and rub each end of the trap with it, if a box-trap, and put two or three drops on the bridge, leaving the paper or rag in the trap. Of whatever kind the trap is, it should, he says, be scented ; but once in a twelvemonth will be sufficient. Then throw some chaff mixed with a little wheat about the bottom of the trap, in order to deceive the rats ; for they are very sagacious, and will not enter a suspicious place. This will be necessary to be done only at the first time of setting the traps, for after some rats have been caught and have watered and dunged in them, rats will enter boldly when they find others have been there before them : do not, therefore, wash or clean out the trap, as some people do before they set it again, but let the dung and urine remain in it. Keep the places where the traps are set as private as possible ; and when they are set for catching, mix no bread with the bait, as the rats will in that case be apt to carry it away."

It is advised, "when the holes are found quiet, and that no rats use them, to stop them up with the following composition. Take a pint of common tar, half an ounce of pearl-ashes, an ounce of oil of vitriol, and a good handful of common salt, mix them all well together, in an old pan or pot. Take some pieces of paper, and lay some of the above mixture very thick on them ; then stop the holes well up with them, and build up the mouth of the holes with brick or stone, and mortar ; if this be properly done, rats will, he asserts, no more approach these, while either smell or taste remains in the composition."

In order to destroy the rats in places where traps cannot be set, he recommends us to "take a quart of the above bait, then rasp into it three nuts of nux vomica, and add a quarter of a pound of crumb of bread, if there was none before ; mix them all well together, and lay it into the mouth of their holes, and in different places where they frequent ; but first give them of the bait without the nux vomica, for three or four succeeding nights ; and when they find it agrees with them, they will eat that mixed with the nut with greediness."

It is observed that "rats are frequently very troublesome in sewers and drains. In such cases arsenic may be used with success, as follows : Take some dead rats, and having put some white arsenic, finely powdered, into an old pep-

per-box, shake a quantity of it on the foreparts of the dead rats, and put them down the holes, or avenues, by the sides of the sewers at which they come in; this puts a stop to the live ones coming any further; for when they perceive the arsenic, they will, he says, retire immediately; whereas if they were put down without the arsenic the live ones would eat them."

We have, however, found that these animals take arsenic best when it is prepared by being finely levigated and mixed up with very strong old cheese and oatmeal. In order to destroy mice, Mr. Forsyth advises to "take a quart of the bait for rats before there is any bread mixed with it; then take four nuts of nux vomica, and rasp them very fine, otherwise the mice will pick out the food from it, on account of its bitter taste; rub them well together; lay some of it on a piece of paper, or, if without doors, on a piece of tile, removing all other food from the place, and it will kill all that eat of it. What is not eaten should be taken away in the morning, and replaced at night. If this be in a garden, shelter it with boards or tiles, that it may not get wet.

"Open traps should likewise be set, as mice are shy in entering close ones. And care should be taken not to convey these animals into gardens by the straw litter, or other similar materials."

Slugs are a sort of animals that are frequently found harbouring about the foundations of walls, and about the roots of pease, lettuce, &c. "They may," Mr. Forsyth says, "be picked off, and killed, by putting them into a pot in which is a little fine unslaked lime; or the ground where they are should be well watered with soap-suds and urine, mixed with tobacco-water. When they are numerous on the surface of the ground, which frequently happens after rain, or in a dewy morning, fine unslaked lime thrown over the borders, &c., will, he says, destroy them. But he prefers the above mixture, which, if the ground be well watered with it, will bring them up out of their holes, when they very soon die; it will also destroy their eggs, which they always deposit in the earth."

"Snails also, during the winter," he says, "gather themselves together in clusters; and in that season are frequently found in great numbers behind wall-trees, and in holes of the walls. They should be carefully picked off and crushed, which is the only effectual way of getting rid of them. If any should escape, they should be destroyed as they make their appearance in the spring. As they also deposit their eggs in the ground, the borders should be well watered in the above manner."

Wasps and flies are highly destructive of all sorts of fruit: therefore, as soon as the wasp and

large flesh-fly make their appearance, "get ready several bottles or phials; then mix up grounds of wine or beer, with sweepings of sugar, honey, or grounds of treacle, and with this mixture fill the bottles half or three-quarters full, then place some of them at the bottom of the wall, and hang a sufficient number up by a piece of yellow willow, or packthread, on the nails against the walls in different places, observing to empty them frequently, as they fill with flies and wasps; first pour the liquor into an empty bottle, and then shake out the dead insects, crushing them with your foot, that none of them may revive; then pour back the liquor into the bottles and phials as at first. In this manner a great many may be destroyed, he says, before the fruit becomes ripe. If you begin to hang up the bottles as soon as you see the fly, which comes much earlier than the wasp, you will be able to destroy great numbers of them, and will have the bottles ready for the wasps when they make their appearance. The fly will be found as destructive as the wasp to grapes." And "when the weather is hot, and the wasps are numerous, if they do not enter the bottles fast enough, (which will happen when the fruit is very ripe), a little oil may, he says, be put in a cup, and with a feather dipped in it touch their backs and they will instantly drop down; when you will find them turned black and green by the effects of the oil."

Birds attack fruit much when it begins to ripen. The best preventive in this case is, Mr. Forsyth says, "to cover the trees with nets, or bunting, a sort of cloth of which ships' colours are made." See *VIRIS*.

There are many other animals of the insect tribe that are likewise highly destructive to fruits and garden crops, but which are noticed under the articles which they are found to injure.

VERVAIN. See *VERBENA*.

VERVAIN MALLOW. See *MALVA* and *URENA*.

VIBURNUM, a genus containing plants of the deciduous and evergreen flowering kind.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Dumoseæ*.

The characters are: that the calyx is a five-parted perianth, superior, very small, permanent: the corolla one-petalled, bell-shaped, five-cleft: segments blunt, reflexed: the stamina have five awl-shaped filaments, length of the corolla: anthers roundish: the pistillum is an inferior germ, roundish: style none, but in its stead a turbinate gland: stigmas three: the pericarpium is a roundish berry, one-celled: the seeds bony, roundish.

The species cultivated are: 1. *V. Lantana*, Wayfaring Tree; 2. *V. Opulus*, Water Elder; 3. *V. Lentago*, Pear-leaved Viburnum; 4. *V. Cassinoides*, Thick-leaved Viburnum; 5. *V. nitidum*, Shining-leaved Viburnum; 6. *V. lavi-gatum*, Cassioberry Bush; 7. *V. nudum*, Oval-leaved Viburnum; 8. *V. prunifolium*, Plum-leaved Viburnum; 9. *V. dentatum*, Tooth-leaved Viburnum; 10. *V. Thunbergii*, Laurustinus or Laurustine.

The first is a thickly-branched shrub or small tree, having round, plant, mealy twigs, with the same kind of tufted stellated pubescence as is found on the flower-stalks, backs, and even upper surfaces of the leaves: the leaves opposite, somewhat elliptical, cordate, obtuse, serrate, strongly veined, turning dark red before they fall in autumn: stipules none: the flowers whitish, in large terminating, solitary, many-flowered cymes. It is a native of most parts of Europe, flowering here in May. It is sometimes known by the name of Plant Mealy Tree; and according to Withering the bark of the root is used to make Birdlime.

There is a variety in North America with larger leaves, of a bright green; and with variegated leaves in nurseries.

The second species is a small bushy tree, smooth in all its parts, and very much branched: branches opposite, round: the leaves subcordate, with three great unequally serrate lobes, veined, paler beneath; their petioles bearing several cup-like glands towards the top, and a pair or two of erect linear appendages, scarcely to be called stipules, near the base: the cymes terminating, solitary, composed of many white flowers, radiant: the inner perfect, small, resembling those of Elder; those in the margin abortive, consisting merely of a large irregular flat petal without any organs of fructification: the stigmas nearly sessile, close together: the berries drooping, globular, crowned with five very small scales of the calyx, red, very succulent. It is a native of Europe, flowering early in June; the bright-red berries ripen about September, and towards the middle of October the leaves assume a beautiful pink colour.

There is an American variety, which is a shrub, that has the twigs of a shining red colour, and which rises eight or ten feet high, with many side branches, covered with a smooth purple bark: the leaves cordate-ovate, ending in acute points, deeply serrate, having many strong veins, and standing upon very long slender footstalks.

There is another beautiful variety common in plantations under the name of Guelder Rose, bearing large round bunches of abortive flowers only, which rises to the height of eighteen or

twenty feet if permitted to stand: the stem becomes large; the branches grow irregular, and are covered with a gray bark: the leaves are divided into three or four lobes, somewhat like those of the Maple; they are about three inches long, and two and a half broad, jagged on their edges, and of a light green colour: the flowers come out in a large corymb, are very white, and, being all neuters, are barren; from their extreme whiteness, and swelling out into a globular form, some country people have given this shrub the name of Snow-ball Tree. It is also sometimes called Elder Rose and Rose Elder.

The third has the branches bent or hanging down: the petioles waving on the edge: the leaves thick, like those of the tenth sort, smooth, serrulate with very small teeth: the germ terminating, awl-shaped, ventricose at the base. It is a native of North America, flowering here in July.

The fourth species has the lowest leaves ob-ovate; the next ovate; the upper ones lanceolate. It is a native of North America. It flowers in June.

The fifth is a native of North America. It flowers in May and June.

The sixth species has the leaves petioled, broad-lanceolate, sharpish, without any raised veins: the petioles decurrent along the back, whence the twigs are acipital: the corymb short: the stem twelve or fourteen feet high, sending out branches from the bottom to the top: the leaves about an inch long, and more than half an inch broad, of a light green colour, opposite, on short footstalks: the peduncles axillary, very short, supporting small umbels of white flowers, which appear in July. It is a native of South Carolina.

The seventh has a strong stem, covered with a brown smooth bark, and rising to the height of ten or twelve feet, sending out woody branches on every side the whole length, which have a smooth purplish bark: the leaves opposite, five inches long and two and a half broad, smooth and of a lucid green above, veined and of a light green beneath, entire at the edges, (indistinctly notched,) and rounded at both ends; of the same thickness with those of the Broad-leaved Laurustinus: the flowers are produced in large umbels (cymes) at the end of the branches, are in shape and colour like those of the common Laurustinus, but smaller; and the stamens are much larger than the corolla: they appear in July, and are succeeded by roundish berries, which, when ripe, are black. It is a native of America, flowering in May and June.

There are varieties with deciduous and ever-green leaves.

The eighth species rises with a woody stalk ten or twelve feet high, covered with a brown bark, and branching its whole length: the branches, when young, are covered with a smooth purple bark: the leaves two inches long, and an inch and quarter broad, slightly serrate, and on short slender footstalks, opposite or without order: the flowers in small umbels (cymes) lateral and terminating; these are white, and smaller than in the first sort, appearing in June, and are sometimes succeeded by berries. It grows naturally in most parts of North America, where it is commonly called *Black Haw*.

The ninth has the stalks soft and pithy, branching out greatly from the bottom upward, and covered with a gray bark: the leaves three inches long, and nearly as broad, strongly veined, of a light green colour, placed opposite upon pretty long footstalks: the flowers in terminating corymbs, white, and almost as long as those of the first sort, appearing in June. It is a native of North America.

There are varieties with the leaves smooth on both sides, and with the leaves downy underneath and drawn out to a point.

In the tenth species the leaves are seldom more than two inches and a half long, and an inch and quarter broad; they are rounded at their base, but end in acute points, are veined and hairy on their under side, and not of so lucid a green colour as the following sort on their upper.

There are several varieties; as the smaller hairy leaved, in which the umbels (cymes) of flowers are smaller, and appear in autumn, continuing all the winter. The plants are much hardier.

The shining-leaved, in which the stalks rise higher, and the branches are much stronger: the bark is smoother, and turns of a purplish colour: the leaves are larger, of a thicker consistence, and of a lucid green colour: the umbels (cymes) are much larger, and so are the flowers; these seldom appear till the spring, and when the winters are sharp, the flowers are killed, and never open unless they are sheltered.

There is a sub-variety of this with variegated leaves; with gold-and silver-striped; in which the branches are warted, the younger ones four-cornered: the leaves opposite, ovate, on short petioles, rigid, shining, perennial; the younger ones hirsute, with short ferruginous villose hairs: flowers in crowded cymes, with little bractes between them: the corolla white; and the berries, when ripe, blue.

The common, with narrower leaves, hairy only on the edge and veins underneath: the fruit smaller.

And the Upright *Laurustinus*.

Culture.—These plants may some of them

be increased by seeds, most of them by layers, many by cuttings, and a few by suckers.

The seeds in the deciduous kinds should be sown in the autumn or spring in beds of light fine mould, being well covered in. The plants appear in the first or second year, and when they are of a twelvemonth's growth they should be planted out in nursery-rows, to be continued till of proper growth to plant out in the shrubberies or other parts of pleasure-grounds, as from two to five feet.

In the *Laurustinus* kinds, the seeds after being mixed with mould in the autumn soon after they become ripe, and exposed to the air and rain in the winter, should in the spring be sown on a gentle hot-bed, or in pots plunged into it; the plants being continued in the bed till the autumn, when they should be removed and managed as in the layer method. The plants raised in this way are said to be hardier than those raised from layers.

The first sort is tedious in being raised from seeds.

In the layer, which is the most expeditious mode of raising most of these plants, the young lower branches should be laid down in the autumn or spring, being pegged down in the usual manner in the earth, when they mostly become well rooted in a twelvemonth, and may then be taken off and planted out where they are to remain, or in the nursery; and sometimes, in some of the kinds, a few are put in pots.

The best season for removing the tenth sort is in the early autumn, that they may be well rooted before the winter.

The first sort succeeds best by layers put down in the autumn. And the striped variety may be increased by budding it upon the plain sort.

The cuttings may be made in the autumn from the strong young shoots, being planted in a moist border in rows, when in the following summer many of them will be well rooted, and form little plants. Most of the deciduous sorts may be raised in this way.

The suckers should be taken up in the autumn or spring with root-fibres, and be planted out in nursery-rows to have a proper growth. The *Guelder Rose* may be readily increased in this way, and sometimes the *Laurustinus*.

The fourth sort is rather tender in winter while in its young growth, as well as the sixth, and should have protection in that season. A plant or two should be constantly laid in pots under shelter. This last is easily increased by layers.

These plants afford much variety and effect in shrubbery and other parts of pleasure-ground, when planted out in a mixed order. The ever-

green sort are often used to cover disagreeable objects. The flowering evergreens are likewise often set out in pots.

VICIA, a genus furnishing plants of the biennial; perennial, and annual hardy kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters are: that the calyx is a one-leaved perianth, tubular, erect, half-five-cleft, acute: upper teeth shorter, converging, all of equal breadth: the corolla papilionaceous: banner oval, with a broad oblong claw, at the tip emarginate with a point, bent back at the sides, with a longitudinal compressed raised line: wings two, oblong, erect, half-cordate, with an oblong claw, shorter than the banner: keel with an oblong two-parted claw, the belly compressed, semiorbicular, shorter than the wings: the stamina have diadelphous filaments, single and nine-cleft: anthers erect, roundish, four-grooved: a nectareous gland springs from the receptacle between the compound stamen and the germ, short, acuminate: the pistillum is a linear germ, compressed, long: style filiform, shorter, ascending at an erect angle: stigma obtuse, transversely bearded below the tip: the pericarpium is a long legume, coriaceous, one-celled, two-valved, terminated by a point: the seeds several, roundish.

The species cultivated is *V. Faba*, The Bean.

It has an annual root: the stem upright, about two feet high to three or four in the larger garden varieties, thick, angular: the leaves without tendrils: the leaflets about three pairs, ovate-oblong, tomentose, convoluted: the flowers several together in the axils, white with a black silken spot in the middle of the wings: the legumes thick, roundish, straight, pointed, very woolly within, containing several large ovate flattened seeds. It is a native of Egypt.

There are several varieties of garden beans; as the Mazagan Bean, which is the first and best sort of early beans at present known. It is brought from a settlement of the Portuguese on the coast of Africa, just without the Straits of Gibraltar, and smaller than those of the Horse Bean.

The early Portugal or Lisbon Bean, which is the next, and appears to be the Mazagan sort saved in Portugal, as it is very like those which are the first year saved in this country. It is the most common sort used by the gardeners for their first crop, but they are not near so well tasted as the Mazagan.

The small Spanish Bean, which comes in soon after the Portugal sort, and is rather a sweeter bean.

The Broad Spanish, which is a little later than the other, but comes in before the common sorts, and is a good bearer.

The Sandwich Bean, which comes soon after the Spanish, and is almost as large as the Windsor Bean; but, being hardier, is commonly sown a month sooner. It is a plentiful bearer, but not very delicate for the table.

The Toker Bean, which comes about the same time with the Sandwich, and is a great bearer.

The White and Black Blossom Beans, which are also by some much esteemed; the beans of the former, when boiled, are almost as green as peas; and being a tolerable sweet bean renders it more valuable. These sorts are very apt to degenerate, if their seeds are not saved with great care.

The Windsor Bean is allowed to be the best of all the sorts for the table: when these are planted on a good soil, and are allowed sufficient room, their seeds will be very large, and in great plenty; and, when they are gathered young, are the sweetest and best-tasted of all the sorts; but these should be carefully saved, by pulling out such of the plants as are not perfectly right, and afterward by sorting out all the good from the bad beans.

This sort of bean is seldom planted before Christmas, because it will not bear the frost so well as many of the other sorts; so it is generally planted for the main crop, to come in June and July.

And of the small early varieties, there is one which is chiefly planted for curiosity. It is a dwarf, six or ten inches in height, with branches spreading like a fan, and flowers succeeded by small pods, both in clusters; whence it is called Dwarf Fan or Cluster Bean.

Also of the middle-sized later beans, a sort now very commonly cultivated is the Long-podded Bean, a yard or more in height, a great bearer, the pods long and narrow, closely filled with oblong middle-sized seeds. Of this there are several sub-varieties, as the early, the tall, the Turkey, &c.

The White-blossomed Bean, which has none of the black mark on the wings. The seed is semitransparent, and having less of the peculiar bean flavour, when young, than any of the others, is by many in much esteem. It bears abundance of smallish, long, narrow pods, and the seeds are almost black when ripe.

And there is a red-blossomed bean, with smallish pods and seeds, but which is not near so palatable as that with white blossoms.

There are also other varieties.

Culture.—These crops are raised with much facility by sowing them at different times from

October to March, or later. The small sorts are mostly used for the earliest crops, and the first two or three of the above sorts are the most proper for the purpose; but the Mazagan kind is the earliest of all, and most proper to plant for the first crop, and the Portugal and Small Spanish Bean next, all of which should be planted early on warm south borders, or other sheltered sunny exposures, under or near walls, pales, or hedges, or other warm defended quarters, every month from October till the beginning of February; in order that if the first planting should fail by inclement weather in winter, the others may succeed; and if all the crops should survive the frost, they will succeed one another regularly in bearing. The planting should be performed in rows, ranging south and north, two feet and a half asunder, an inch and half deep, and two or three inches apart in each row. They may also be planted in one row length-ways close along under a south wall, &c.

The Dwarf Bean is not proper to be planted for any general crop, only a few for variety; and for which purpose it may be put in in autumn or winter, or in any of the spring or summer months till June or July, in rows two feet asunder, or in patches about the borders.

Of the middle-sized sorts, the Long-pods, Broad-Spanish, and White-blossomed Bean are the best for general culture; though some of all the others may be planted occasionally; and the season for these sorts being put in, is for the first crop in November or December, on a broad warm border, or in any of the most sheltered kitchen-garden quarters, in rows two feet and half or a yard asunder, three inches distance in the row, and two or three inches deep; repeating the planting every month till March, in the open quarters.

Of the large kind, the Sandwich and Toker kinds, being generally more plentiful bearers, and of somewhat less succulent growth than the Windsor, are rather hardier to resist the frost, and may be planted earlier, as before Christmas, for the first crop; and any time after, till May, if required; and of the Windsor, a small or moderate crop may be planted in December, in open mild weather, and a dry soil; in a larger supply in January; and a first full crop in February; and thence in full supplies, of these or any of the other larger sort, every three or four weeks, till the end of April, for the main crops; continuing planting them till the end of May, to have successions as long in the season as possible. These should constantly be planted in open exposures, in rows a yard asunder, or three feet and a half for the large Windsor sort; four or five inches asunder in each row, and three deep.

They succeed in any common soil, but where the land is manured for them it is the best.

The general method of planting them is by the dibble, or in drills; for early planting in dry ground, a shallow drill may be first made, then planting the beans in a row along the bottom, allowing from two to four or five inches distance in the row, according to the size or growth of the different varieties, and from one and a half to three inches deep in the small and large beans; and when the plants are come up about three inches high, they should be landed or earthed up on each side of the row with a drawing hoe, keeping them clear from weeds by occasional hoeing in dry weather; and after having advanced nearly to full growth and in bloom, it is proper to top the plants in general, which throws all the nourishment to the embryo pods, and greatly promotes their setting, and forwards their growth; and in the latter crops prevents their being so much annoyed with the small black fly.

In gathering the crops, avoid pulling up the stems, especially when the land is moist.

VINCA, a genus comprehending plants of the shrubby, evergreen, upright, and trailing kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a five-parted perianth, erect, acute, permanent: the corolla one-petalled, salver-shaped: tube longer than the calyx, cylindric below, wider above, marked with five lines, the mouth a pentagon: border horizontal, five-parted: segments fastened to the apex of the tube, wider outwards and obliquely truncate: the stamina have five filaments, very short, inflexed and retroflected: anthers membranaceous, obtuse, erect, curved in, fariniferous on both sides at the edge: the pistillum has two roundish germs, with two roundish little bodies lying by their sides: style one common to both, cylindric, length of the stamens: stigma capitate, concave, placed on a flat ring: the pericarpium has two follicles, round, long, acuminate, erect, one-valved, opening longitudinally: the seeds numerous, oblong, cylindric, grooved, naked.

The species cultivated are: 1. *V. minor*, Small Periwinkle; 2. *V. major*, Great Periwinkle; 3. *V. rosea*, Madagascar Periwinkle.

The first has a perennial creeping root, with branched fibres: the whole plant smooth and shining: the stems round, slender, leafy, erect when in flower, from nine inches to a foot in height, and much higher when supported by bushes, marked on each side with a groove faintly impressed; after flowering, prostrate, elongated, taking root at their joints. Accord-



Painted by J. Edwards

London Published Dec^r 1st 1808, by G. Kearsley Fleet Street

Engraved by F. Sanftm

Vinca Rosea
1 *Madagascar Periwinkle*

Viburnum Tinus
2 *Laurustinus*

Digitized by Google



ing to Woodward, the flowering-stem is upright in the spring, but in autumn the flowers are borne on the shoots of the year, which are trailing: the leaves opposite, on footstalks about one-fourth the length of the leaves, which are quite entire, evergreen, shining, somewhat like those of Privet, not having the fringed edge observable in the second sort: the flowers axillary, alternate, solitary, void of scent, on nearly upright peduncles, almost twice the length of the leaves, round, smooth, and shining, pale blue. It is a native of Germany.

It varies in the colour of the flowers; with pale blue, with purple, and white, and with double flowers; and the foliage is sometimes variegated either with white or yellow stripes.

The second species is larger in all its parts than the preceding: the stems erect, finally rooting at the end: the leaves broad-ovate, three inches long and two broad, of a thick consistence, finely fringed with short rigid hairs at the edge, on thick footstalks: the flowers solitary, alternate, on peduncles half the length of the leaves, of a purple blueish colour. It is a native of France, Spain, &c. flowering in May.

The third has an upright branching stem, three or four feet high, when young, succulent, jointed, purple; but as the plant advances the lower parts become woody: the branches have the joints very close, are covered with a smooth purple bark, and have oblong, ovate, entire leaves, two inches and a half long and an inch and half broad, smooth and succulent, setting pretty close to the branches: the flowers axillary, solitary, on very short peduncles: tube long and slender: brim spreading open, flat, divided into five broad obtuse segments, which are reflexed at their points: the upper surface of the petal is of a bright crimson or peach colour, and their under side pale flesh-colour: there is a succession of flowers, from February to the end of October. It is a native of Madagascar, China, &c.

Culture.—These plants are all capable of being increased by layers, cuttings, and suckers.

In the first method, when the layers of the trailing branches are put down into the ground, they readily take root at almost any season. This is very much the case with the first sort, as almost every joint furnishes plants in the course of the summer ready to be put out in the autumn.

The cuttings may be made from the stalks and branches, and be planted in shady borders in the autumn or early spring, where they will become well rooted by the following autumn.

All the sorts succeed in this way.

In the third sort the cuttings should be made from the young shoots and be planted in pots, plunging them in a hot-bed or the bark-bed,

where they will become perfectly well rooted in the same year, and may be potted off separately, being placed in the stove, and shifted as may be necessary into large pots.

This sort may likewise be raised from seed, which should be sown in pots in the early spring filled with light rich earth, covering them well in, and plunging the pots in the hot-bed, or the bark-bed of the stove; and when the plants have a few inches growth, they should be pricked out into separate pots, replunging them in a hot-bed, giving proper shade and water, managing them afterwards as the cuttings.

The suckers may be taken off with root-fibres in the autumn or spring, and planted where they are to grow.

The two first sorts afford variety in the borders, clumps, &c. while the last has a fine effect in stove collections.

VINE. See VITIS.

VINERY, a sort of garden erection, consisting of a wall twelve or fourteen feet in height, extending from east to west, furnished with stoves, and proper flues, with roof and lights of glass, covering a border of some extent; as ten feet or more in width. When vines are to be forced at an early season, upright glasses two and half or three feet in height are often employed in front, to support the roof, and to admit sun and light to the border, which is frequently occupied with low-growing vegetables; but when they are not wanted early, a low wall will answer equally well. In plate D. is seen an improved vinery, or house of this kind; in which fig. 1. shows the elevation: fig. 2, section of the end: fig. 3. section showing the flues: fig. 4. the plan. It has been found to answer well in actual practice. In houses of this sort, supposing the wall to be twelve feet high, the breadth ten feet, and the height of the upright wall in front three feet, the roof will form an angle of about forty-three degrees, which experience has shown to be a suitable pitch for forcing vines with advantage.

These sorts of buildings may likewise be constructed on a plan somewhat similar to that of a single-pitted pine-stove, having the back wall fourteen feet high; the roof slanting, and covering an extent of about sixteen feet; with a flue running from east to west near the front wall. This is well suited not only for grapes, but early crops of melons, strawberries, and other similar kinds.

To save the expense of glass; where there are peach-houses, the glass frames may be also employed for the vinery, when constructed with this intention, and good grapes may be obtained from vines trained against walls about six feet

high, by means of melon-frame glasses, where a small slanting roof is made proper to receive them. But a small degree of fire-heat is of great advantage, and might be applied either by a flued wall, the flue running through the house, or by cast-iron pipes for the purpose.

"These houses," Mr. Nicol says, "vary exceedingly in construction; and although some lay great stress on this article, and there are extremes which ought not to be followed; he is convinced the failure of success, in the production of the grape, is much less a consequence of *bad* construction in the house, than in the preparation of the border, the choice of the kinds, and the general management. It has fallen to his lot to have the construction and management of three several and differently constructed grape houses, in the same garden, under his care, for years, which have equally and uniformly produced excellent crops. This, in his opinion, is a proof of the necessity of a greater niceness in the formation of the border being observed, than in the construction of the house; the fireplace and flues excepted, which should always be particularly attended to."

He also thinks that the site of a vinery is an object of such consequence to the welfare of the plant, and successful cultivation and production of well-flavoured fruit, that the greatest care should be taken in the choice of it. "A gentle hill, having a south aspect, and considerable declivity that way, the soil a strong brown loam of two feet, over a bottom of dry sand, gravel, or soft clay, is, he says, the most desirable, and would be the least expensive of all situations. In this case, the border requires no paving or draining; and admits of a proper mixture of sandy loam, vegetable mould, marle, and dung, by the removal of two feet of the natural bottom, with the natural soil, to form a border, perfectly adapted to the growth of the vine, in the following proportion, viz. One half strong brown loam, a quarter light sandy loam, an eighth vegetable mould of decayed tree leaves, and an eighth stable dung; to which add about a fiftieth part of shell marle. This is the composition, he says, of the vine borders at Wemyss Castle, none of which are less than four feet deep, and one (owing to the accidental situation of the house) is six." See FORCING OF VINES.

In order to form borders against these hot-walls in other cases, they should have the earth taken out two feet deep where the ground is dry, but in other cases one foot will be sufficient, as in wet sills the borders should be raised at least two feet above the level of the ground, to prevent the roots of the vines from being injured by the wet. The bottom of this trench

should be filled with stones, lime rubbish, &c., a foot and a half or two feet in thickness, which should be levelled and beaten down pretty hard, to prevent the roots from running downward. The trenches should be made five feet wide at least, otherwise the roots will in a few years extend themselves beyond the rubbish, and, finding an easy passage downwards, run into the moist ground, and be thereby much injured or destroyed; but before the rubbish is filled into the trench, it is a better method to raise a nine-inch wall, at that distance from the hot-wall, which will keep the rubbish from intermixing with the neighbouring earth, and also confine the roots to the border in which they are planted. This wall should be raised to the height of the intended border, and may be useful to lay the plate of timber of the frames upon, which will be necessary to cover the vines when they are forced; and where the borders are raised to any considerable height above the level of the ground, these walls may preserve the earth of the borders from falling down into the walks; but in carrying them up it will be proper to leave little openings about eight or ten feet distant, to let the water pass off by. As soon as the walls are finished and thoroughly dry, the rubbish should be filled in, as directed above, when there should be fresh light earth laid upon it two feet thick, which will be a sufficient depth of mould for the vines to root in. The borders should be prepared in this manner at least a month or six weeks before the vines are planted, in order that they may have time to settle. See VITIS.

VIOLA, a genus containing plants of the herbaceous fibrous-rooted perennial kind.

It belongs to the class and order *Syngenesia Monogamia* (*Pentandria Monogynia*), and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a five-leaved perianth, short, permanent: leaflets ovate-oblong, erect, more acute at the tip, obtuse at the base, fastened above the base, equal, but variously disposed: of which two support the uppermost petal, two others each a second and third lateral petals, and the remaining one, the two lowest petals together: the corolla five-petalled, irregular: petals unequal: the uppermost petal straight, turned downwards, wider, blunter, emarginate, finishing at the base in a blunt horned nectary, prominent between the leaflets of the calyx: the two lateral ones paired, opposite, obtuse, straight: the two lowest paired, bigger, reflexed upwards: the stamina have five filaments, very small; two of them, which are nearest to the uppermost petal, enter the nectary by annexed appendages: anthers commonly connected, obtuse, increased by

membranes at the tip: the pistillum is a superior germ, roundish: style filiform, prominent beyond the anthers: stigma oblique: the pericarpium is an ovate capsule, three-cornered, obtuse, one-celled, three-valved: the seeds many, ovate, appendicled, fastened to the valves: the receptacle linear, running like a line along each valve.

The species cultivated are: 1. *V. odorata*, Sweet Violet; 2. *V. palmata*, Palmated Violet; 3. *V. pedata*, Multifid-leaved Violet; 4. *V. tricolor*, Pansy Violet or Heart's Ease.

The first has a fibrous whitish root; in old plants the upper part becomes knobby, and appears above ground, the knobs being formed from the base of the petioles which are left yearly; from the bosom of these knobs spring the scions or runners which creep on the ground, and are furnished with leaves and the same kind of stipules which are observable at the bottom of the plant; these runners are very long, and in general do not produce flowers till the second year: the leaves somewhat rounded at the tip, notched at the edge, on the upper side smooth and shining, underneath slightly hairy, when young rolled in at the edges on longish upright nearly smooth footstalks, which sometimes, however, have a few scattered hairs: the stipules from the stump of the root in pairs, lanceolate, toothed, pale: each tooth terminates in a minute gland: the flower-stalks springing from the root, taller than the leaves, smooth, bearing a pair of narrow bractes, pressed to the stalk, and placed above the middle of it: they are incurvated at top, and support one nodding flower of a dark purple colour. It is a native of every part of Europe, flowering in March and April. It is in general very highly esteemed for its fragrance.

There are different varieties: as the single blue and white, the double blue and white, and the pale purple; it is also found with white flowers; and it has been found wild with double flowers. This variety is in much esteem, both for the superior size of the flowers and their extreme fragrantcy; and as they appear later they keep up the succession.

The second species has a perennial root: the leaves five-parted: the segments ovate: the middle segment wider: the outer one toothed only at the base. It is a native of Virginia, flowering here in May and June.

It is curious, and rare in this country, having no sweet scent to recommend it.

The third has the leaves divided into seven parts or lobes, which are sometimes toothed; they are of the sort called pedate: the flowers stand upon naked foot-stalks, are blue, and have

VOL. II.

no scent. It is a native of North America, flowering in June.

The fourth has the stem about four or six inches high, angular, pubescent, at bottom of a dull purple colour: branches alternate, erect: the leaves alternate, petioled, hairy especially about the edge, but sometimes smooth; the lowermost often smaller and roundish, the uppermost narrow and slightly indented: the peduncles alternate, nearly quadrangular, channelled on the back, bent in at top: the petals obcordate, shorter than the calyx, and whitish or yellow-white, in its wild state, but longer than the calyx, and variegated with yellow and purple in gardens. The truly wild plant has sometimes a few purple streaks, and in a somewhat improved state is blue or purplish, with or without yellow or white. It is a native of Europe and Japan, flowering from May to September.

It varies with more than two colours; as purple, blue, yellow, white, improved and enlarged by garden culture.

Culture.—The first sort may be increased by seeds or parting the roots: the seeds may be sown in a bed of light earth, soon after they become ripe, in the beginning of autumn; and when they have some growth be removed into a shady border, until the autumn, when they may be set out where they are to grow. The double-flowered sorts afford no seed. The best mode is, however, by parting the roots in the early autumn, or after they have flowered, and planting them out in the borders, or in beds at good distances, at the latter season watering them well. When intended for flowers they should not be parted oftener than once in three or four years.

The second and third sorts succeed best by being planted in pots filled with loam and bog earth well mixed, plunging them in the mould of a north border, where they should be protected in winter, or removed under a common hot-bed frame.

The fourth sort rises readily from scattered seeds, and may be raised by sowing the seed where the plants are to grow in the autumn or spring.

They may likewise be increased by planting out the off-set slips of the large bushy plants, taken off with root-fibres, in the autumn or spring, in the borders, or in beds for increasing their growth. The varieties may be preserved in this way with safety.

These plants afford variety in the borders and other parts; and the first sort is useful for the flowers.

VIOLET. See VIOLA.

3 T

VIOLET, DAMASK, and DAME'S. See HESPERIS.

VIOLET, DOG-TOOTH. See ERYTHRONIUM.

VIPER'S GRASS. See SCORZONERA.

VIRGA AUREA. See SOLIDAGO.

VIRGINIAN ACACIA. See ROBINIA.

VIRGINIAN CREEPER. See CLEMATIS.

VIRGINIAN GUELDER ROSE. See SPIRÆA OPULIFOLIA.

VIRGINIAN POKE. See PHYTOLACCA DECANDRA.

VIRGINIAN SILK. See PERIPLOCA.

VIRGIN'S BOWER. See CLEMATIS.

VITEX, a genus containing plants of the hardy and under-shrubby kinds.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatae*.

The characters are: that the calyx is a one-leaved perianth, tubular, cylindric, very short, five-toothed; the corolla one-petalled, ringent: tube cylindric, slender; border flat, two-lipped: upper lip trifid, with the middle segment wider: lower lip trifid, with the middle segment bigger: the stamina have four filaments, capillary, a little longer than the tube, two of which are shorter than the others: anthers versatile: the pistillum is a roundish germ: style filiform, length of the tube: stigmas two, awl-shaped, spreading: the pericarpium is a globular berry or drupe, four-celled: the seeds solitary, ovate.

The species cultivated are: 1. *V. Agnus castus*, Official Chaste Tree; 2. *V. incisa*, Cut-leaved Chaste Tree; 3. *V. trifolia*, Three-leaved Chaste Tree; 4. *V. Negundo*, Five-leaved Chaste Tree.

The first has a shrubby stalk eight or ten feet high, sending out their whole-length opposite branches, which are angular, pliable, and have a grayish bark: the leaves for the most part opposite upon pretty long footstalks; they are composed of five, six, or seven leaflets, spreading out like the fingers of a hand; the lower ones small, and the middle largest; they are smooth and entire; the largest are about three inches long, and half an inch broad in the middle, ending in blunt points, of a dark green on their upper side, but hoary on their under: the flowers are produced in spikes at the extremity of the branches, from seven to fifteen inches in length, composed of distant whorls; in some plants they are white, in others blue. They are generally late before they appear. They have an agreeable odour when they open fair, and make a good appearance in autumn, when the flowers of most other shrubs are gone. It is a native of Sicily.

There are varieties with narrow leaves, with broad leaves, with blue flowers, and with white flowers.

The second species has the stature of the preceding, but smaller in all its parts, with quinate acuminate pinnatifid leaves pubescent underneath. It is a shrub seldom rising more than three feet high, sending out on every side spreading branches, which are slender and angular: the leaves opposite upon pretty long footstalks; some composed of three, others of five leaflets, which are deeply and regularly cut on their sides, like pinnatifid leaves, and end in acute points: the largest of these leaflets is about an inch and half long, and three quarters of an inch broad in the middle; they are of a dull green colour on their upper side, and gray on their under: the branches are terminated by spikes of flowers three or four inches long, disposed in whorls; in some plants they are white, in others blue, and some have bright red flowers: they are in beauty from the middle of July to the beginning of September. It is a native of China.

The third has the leaflets ovate, acute, quite entire, tomentose underneath, the two nearest to the petiole smaller: the stem is shrubby, branched, round, eight feet high, the thickness of a finger, procumbent, sometimes creeping: the leaves ternate, seldom quinate: leaflets waved, dusky, green above, cinereous-hoary beneath, soft: common petioles long, opposite: the flowers violet in dichotomous, terminating racemes: the fruit small, globular, hard, smooth, black, like pepper, four-seeded. It is a native of the East Indies.

The fourth species has the stem arboreous, twisted, the thickness of the human arm, with spreading branches: the leaflets lanceolate, for the most part quite entire, but sometimes serrate, flat-veined, of a dusky ash colour, on opposite petioles: the flowers purplish, in loose, terminating, erect racemes. It is a native of the East Indies.

Culture.—The first sort may be increased by cuttings and layers: the cuttings should be planted out in the early spring, in a fresh light soil, being often refreshed with water till they have taken root; afterwards the plants must be kept clear from weeds, and be protected during the following winter with mulch or mats; and about the middle of the following March, when the season is fine, be removed into the places where they are to grow, or into the nursery for two or three years to become strong; being pruned up to form regular stems.

The layers of the branches may be laid down in the spring, being careful not to split them,

watering them in dry weather; when in about a year they may be taken off and planted out in the same manner as the cuttings.

The second sort may likewise be increased by cuttings, which should be planted in pots, plunged in a moderate hot-bed, covering them with glasses; when well rooted they may be taken up, and be planted in separate small pots filled with light earth, placing them in the shade till fresh rooted, afterwards placing them in a sheltered situation, with other green-house plants, until the autumn, when they must have protection from frost, and have very little water. They are late in putting out leaves in the spring, so as almost to appear dead.

The third sort is raised from cuttings, which should be planted in pots in the early spring, as April, plunging them in a moderate hot-bed, covering them with hand-glasses, being slightly watered; when they have taken root, they should have free air admitted in a gradual manner; then they may be taken up and planted out in separate pots filled with light earth, replunging them in the bed, and giving due shade. They should afterwards have plenty of free air when the weather is suitable, being treated as tender plants. It must be constantly kept in the stove, having free air in the summer season. It retains its leaves all the year. This may also be raised from layers.

The fourth sort may also be raised from cuttings, in the same manner as the second.

The first sorts may be introduced in the shrubberies, clumps, &c., and the latter kinds afford variety in stove and green-house collections.

VITIS, a genus containing plants of the deciduous climbing kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Heideraceæ*.

The characters are: that the calyx is a five-toothed perianth, very small: the corolla, petals five, rude, small, caducous: the stamina have five awl-shaped filaments, from erect spreading, caducous: anthers simple: the pistillum is an ovate germ: style none: stigma obtuse-headed: the pericarpium is a globular or ovate berry, two-celled: the seeds two, bony, turbinate-cordate, contracted at the base, semibilocular.

The species cultivated are: 1. *V. vinifera*, Common Vine; 2. *V. Indica*, Indian Vine; 3. *V. laciniata*, Parsley-leaved Vine; 4. *V. arborea*, Pepper Vine.

The first is universally known to have a thick twisted irregular weak stem, covered with a brown cloven bark, and having very long tough flexible branches, trailing along the ground, or

climbing trees by means of tendrils: the leaves are lobed and sinuated, serrate, smooth and alternate, on long foot-stalks: the tendrils are opposite to a leaf, and are attended by the flowers in a raceme: the flowers are whitish or herbaceous, very small and insignificant in appearance, but having a very agreeable smell: the petals cohering at the tip and concealing the genitals in manner of a veil, but soon fall off: the berry globular, in some varieties ovate, before it is ripe regularly divided into five cells, but afterwards one-celled, almost pellucid, coloured in some, colourless in others. It is a native of most of the temperate parts of the world. In very cold regions it refuses to grow, and within 25° or even 30° of the equinoctial line, it seldom flourishes so as to produce good fruit. In the northern hemisphere, the proper wine country is from 25° to 51° of latitude.

According to Forsyth, the following are the varieties which are in most esteem in this climate, for the hot-house, vinery, and the natural wall.

SORTS PROPER FOR THE HOT-HOUSE.

The White Muscat of Alexandria, or Alexandrian Frontinac, in which the berries are oval, and the bunches long. It has a rich vinous juice, and is esteemed an exceeding good grape for the hot-house.

The Red Muscat of Alexandria, which resembles the former, only the berries are of a red colour.

The Black Muscadel, which has large oval berries of a black colour and pleasant juice.

The Red Muscadel, which has large red berries of an oval shape, and ripens late; the bunches are very large.

The Black Damascus, which has large, round, black-coloured berries; the flesh is rich and well flavoured. It is an excellent late grape.

The Black Grape from Tripoli, which has large black berries, and is an excellent grape.

The White Hamburgh, which has large oval-shaped berries, and is a pretty good bearer.

The Red Grape, from Syracuse, which is a very fine large grape.

Le Cœur Grape, or Morocco Grape, which has berries of a tawny colour, and is highly esteemed.

The Golden Galician Grape, which has large oval berries of a yellow colour, and tolerable flavour.

The Black Raisin Grape, which has large black berries of an oval form; the skin is thick, and the flesh firm.

The White Raisin Grape, which resembles the preceding; only that the berries are white.

The Malvoise, sometimes called the Blue

Tokay, which has small brownish berries powdered with a blue bloom; the juice is vinous.

The Syrian Grape, which has large, white, oval berries, with a thick skin and hard flesh, and is a good bearer.

The Damson Grape, which has very large berries of a purple colour.

The Cornichon Grape, which has berries of a remarkable shape, long and narrow, of a white colour, with a firm sweet flesh.

The Red Chasselas, which is very like the Chasselas Blanc in size and shape, but is of a dark-red colour; it is a very good grape, but ripens later than the White.

SORTS PROPER FOR THE VINERY.

The Red Frontinac, or Muscat Rouge, which is a very fine grape, and greatly esteemed: it has large brick-coloured berries, and the juice is of a highly vinous flavour.

The Large Black Cluster, which is larger than the former, and has a very rough harsh taste. Mr. Speechly says, that he had this grape from Lisbon, and was assured that it is the grape of which they make red port wine. He has had the same grape eight or ten years.

The White Grape, from Alcobaca, which bears large bunches of white juicy berries.

The White Parsley-leaved Grape, or Ciotat, which has round berries, white, juicy, and sweet. There is a sort of the Parsley-leaved Grape with red fruit.

The White Corinth Grape, which has a small round berry, with a fine juicy flesh of an agreeable flavour.

The St. Peter's Grape, which has a large oval berry, of a deep black colour when ripe; the bunches are large, and the flesh juicy; it ripens late.

SORT PROPER FOR THE WALL.

The White or Common Muscadine, by some called the Chassclas, which resembles the Royal Muscadine, but the berries are smaller; and, although it is not so sweet as the Royal, it is the best grape that we have for a common wall, and a great bearer.

SORTS PROPER FOR THE HOT-HOUSE AND VINERY.

The Black Muscadine, which is a good bearer, and the berries are beautifully powdered with a bluish bloom.

The Royal Muscadine, D'Arboyce, or Chasselas Blanc, which is an excellent grape; the bunches are large, and composed of round amber-coloured berries of a rich vinous taste. In a fine season it ripens in September.

The White Muscat, from Lunel, which has

large oval berries, of an amber-colour, and full of a vinous juice. It is a plentiful bearer, and highly esteemed.

The Black Spanish, or Alicante Grape, which has black berries of a pleasant flavour.

The Black Grape from Lisbon, which has large round juicy berries, and the bunches resemble the Black Hamburgh. It is a good grape.

The Black Frontinac, or Muscat Noir, which has pretty large round berries, black when ripe, and covered with a mealy powder.

The Grizzly Frontinac, which has round berries, of a colour composed of brown, red, and yellow. It has an excellent flavour.

The Black Hamburgh, which has the bunches large, composed of large oval black berries, of a pleasant sweet juice and vinous flavour. It ripens in November.

The Red Hamburgh, which has thin-skinned berries of a dark-red. They have a rich vinous flavour, and ripen about the same time with the former.

The White Morillon, which has an oval-shaped juicy berry, and the leaves are downy on the under side.

The Aleppo Grape, which has middle-sized berries, with a juicy flesh of a very fine flavour. It is a curious grape, frequently striped black and white.

The Genuine Tokay, which is a white grape, with a thin skin, delicate flesh, and agreeable juice.

The Lombardy Grape, which has fine, large, flame-coloured berries, full of a fine juice; and the bunches grow to a great size, frequently weighing more than six pounds.

The Smyrna Grape, which has a large red berry, of a very fine flavour, and is esteemed a very good grape.

The Brick Grape, so called from its colour, has small berries, but the juice is sweet.

The Claret Grape, which has small black berries with a blood-red juice; but the grape is very harsh, if not perfectly ripe.

The Cat's Grape, which has small berries, of a pale-green colour; the flesh is soft and juicy, but of a very disagreeable taste, unless quite ripe.

The Greek Grape, in which the berries are of a blueish white colour; and it is esteemed a fine grape.

The Black Corinth, or Currant Grape, which has a small roundish berry, generally without a stone, of a deep black colour; it has a sweet juice, and ripens in October.

The New Muscat of Jerusalem, which has large round berries of a red colour; some of which, in fine seasons, are as large as a gooseberry; but, as it does not ripen well on

the natural wall in this country, it might be worth while to try it in a hot-house or vinery.

The Black Prince, which has fine large berries, and the bunches grow to a large size: Mr. Forsyth has had them in a favourable season, on the natural wall, weighing a pound and a half; it ripens on the natural wall in October. It deserves a place in the hot-house and vinery.

SORTS PROPER FOR THE VINERY AND WALL.

The July Grape, or Morillon Noir Hatif, is a small round black berry of a sugary juice; and is principally esteemed for being early ripe, which is in September.

The Malmsey Muscadine somewhat resembles the preceding; the juice is very sweet, and of a high flavour. This is a good bearer, and a very fine grape.

The Black Sweet Water has a small roundish berry, of a sweet taste; but, being apt to crack, is not in much repute. The birds are very fond of this grape, which ripens in September.

The Small Black Cluster has small oval berries; the leaves are covered with a hoary down. This is a very pleasant fruit.

The Early White Grape, from Teneriffe; the berries are of a middling size, and the flesh remarkably sweet and juicy.

The Auverna, or True Burgundy Grape, sometimes called the Black Morillon, is an indifferent fruit for the table, but is esteemed one of the best for making wine.

SORTS PROPER FOR THE HOT-HOUSE, VINERY, AND WALL.

The White Sweet Water, which has a large berry of a white colour, and very agreeable juice; it is esteemed an excellent grape, and ripens in September.

The White Frontinac, or Muscat Blanc, which has large bunches composed of round berries: the juice of this grape, when fully ripe, is exquisite.

To this list are added the following sorts, without any descriptions:—

The Black Frankindale, the Black Gibraltar, the Black Muscat of Alexandria, the Miller Grape, the New White Sweet Water, the Pâsse Musk, the Pearl Muscadine, the Red Constantia, the Red Raisin, the Sir Abraham Pitcher's Fine Black, the West's St. Peter, the White Constantia.

The following are the sorts recommended for a small garden, by the same author:—

"The White Muscadine, White Sweet Water, Black Sweet Water, Large Black Cluster, Small Black Cluster, the Miller Grape; and the St. Peter's, and the Black Hamburg, answer well in favourable seasons."

The author of the Scotch Forcing Gardener observes, that "amongst the numerous varieties of grapes, he does not know above eighteen or twenty kinds worth a place in the vinery, and even that number cannot have places in an ordinary-sized house; but where there are two or three houses, a variety to the extent of twenty-four kinds may be encouraged, without transgressing the bounds of moderation." The following is the list which he advises:—

White Sweet Water, White Muscadine, Royal do. Black do. Black Frontinac, White do. Red do. Grisly do. Black Hamburg, White do. White Raisin, Red do. Syrian, White Tokay, Flame-coloured do. White Pâsse Mosque, Grecian, White Muscat of Alexandria, Black do. Large Black Cluster, Black Constantia, White do. St. Peter's Grape, Lombardy.

Out of which, he thinks, the proprietors of grape-houses may choose so as to stock any grape-house.

The second species has the trunk woody, sending out many slender branches furnished with branching tendrils, by which they fasten themselves to trees: the flowers in bunches like those of the other sorts; succeeded by berries or grapes of an austere taste: the size of the common vine, but with gray hairs scattered over the whole: the leaves undivided, almost smooth above, but villose and veined beneath with thick vessels: it has a simple tendril from the axils, and simple raceme from the middle of the tendril: the flowers white, like those of the common vine, and equal, on small lateral racemes: the berries round, brownish-green, small, watery, acid, eatable. It is said to produce a great quantity of small black grapes in the lower hills of Jamaica; but they are of a rough taste, and would doubtless make an excellent red wine if properly managed. It seems to thrive best in the Red-hills. It is there known by the name of Water-witbe. It is a native of the East and West Indies, &c.

The third has the stalks and branches like those of the common grape, but the leaves are cut into many slender segments: the grapes are round, white, and disposed in loose bunches. It is now little known, as the fruit has little flavour, and ripens late in autumn; only a few plants are preserved for the sake of variety.

The fourth species has the stem woody, sending out many slender branches, which climb by tendrils: the leaves are composed of many smaller winged leaves, divided somewhat like those of common Parsley, of a lucid green on their upper side, but much paler on their under: the flowers axillary in loose bunches, very small, white, composed of five small petals, which ex-

pand and soon fall off: they are not succeeded by any fruit in this climate; but the berries which come from North America, their native place of growth, have generally three seeds in each of them.

Culture.—The vine may be increased in different ways: as by seeds, cuttings, layers, as well as grafting and inoculation; but the cutting and layer methods are the most commonly employed.

In raising vines from seeds, they should be sown in the early spring, as about the beginning of March, in small pots filled with mould of the light fresh kind, to the number of three or four seeds in each, plunging the pots in a moderate hot-bed, the mould being gently sprinkled over with water, from a fine-rosed watering pot, every day when the weather is hot and dry, which should be performed in the latter part of the day as the sun disappears from the frame. But when the season is such as to keep the mould in the pots properly moist, the waterings may be omitted. As soon as the waterings have been performed, the frames should be shut down, and be kept in that state during the night when the heat is not too great.

When the heat of the bed begins to decline, a lining of horse dung and fresh leaves should be added; or the heat be renewed by stirring the old beds up and making slight additions to them. This should be continued till the plants have acquired sufficient strength to support themselves without bottom heat.

It will be necessary about the end of August, Mr. Forsyth says, "to take the lights off, that the plants may be hardened before winter, taking care to shelter them in frames covered with mats, which will prevent the frost in the latter end of October and beginning of November from injuring the tender shoots."

And when the plants are about six inches high, they should, he says, "be transplanted singly into deep pots, forty-eights, filled with the same sort of vegetable mould that is directed to be used for vines; taking great care not to hurt the roots, nor to break the leaders; then plunging them again into the hot-beds: but if the heat of the old bed be too much decayed, it will be necessary to have a new one prepared before-hand, to receive the pots as soon as the plants are transplanted. When they grow vigorously, it will also be necessary to shift them into thirty-twos. When the plants are above six inches high, they should, he says, be carefully tied to small rods, leaving only one stem for the first year. The rods should be as high as the frames will permit." And when the leaves begin to drop, they should, he says, "be care-

fully picked off the pots, to prevent the plants from getting mouldy, which would very much injure their growth."

He likewise advises, that they "should be kept under frames, or put into the green-house, in hard winters, to shelter them from severe frosts. In the spring, about March or the beginning of April, if from seed ripened in this country, they may be planted out against the walls where they are to remain; but, if from seed imported from vine countries, he would advise not to plant above one or two against the wall, or in the hot-house, before a specimen of the fruit has been obtained, and proof afforded that the vines are worth cultivation." It is likewise recommended that after they are planted, they should be cut at the third eye, if strong; but at the second, if weakly; at the same time rubbing off the lower bud with the finger and thumb, as directed below.

Where the method by cuttings is made use of, these should be chosen from the shoots that are best ripened, and have the shortest joints; always having one or two joints of the last year's wood, cutting it perfectly smooth and a little rounding at the lower end, and as near to a joint of the old wood as possible. The upper end should also be cut smooth and sloping towards the wall; but if they are planted in beds or borders, the cut should always face towards the north. When cuttings are planted against piers or walls, it should be at about a foot distance from each other, according to the vacant space, and so deep as to have the second eye level with the ground, constantly rubbing off the lower eye; as by this means, where no accident happens to the top bud, there will be a shoot produced from each eye, with a little one under, which should always be rubbed off as soon as it begins to swell; as if suffered to grow to any considerable size there will be danger of injuring the large one in rubbing the small one off. All the runners and side-shoots should likewise be picked off as directed above, leaving only two shoots, which should be trained at their full length. About the beginning of February they may be pruned, leaving one or two eyes on each according to the strength of the shoot, which should be managed as explained below.

"For the first year," Mr. Forsyth says, "especially if the summer be dry, and proper attention be not paid to the watering of them, they will make but little progress; but in the second year it may be plainly discerned which is the strongest plant, which only should, he says, be left to fill up the vacant space on the wall; the rest should be taken up and planted in other situations where they are wanted for fruit."

A method is made use of by Mr. Speechly and others, of propagating the vine from one eye, and a few inches of the preceding year's wood, which they prefer to those raised by cuttings in the common way, on these accounts: "they have more abundant roots, grow shorter jointed, are more prolific, and will, if permitted, come into bearing the second year."

It is advised that choice should be made of cuttings after a warm dry season, when the wood ripens well; each cutting having two inches of the old wood, with one eye of the new. When the vines are pruned there is great choice; they should therefore be then selected of a middling size, the wood round and perfectly ripened.

After this, pots are to be filled with rich light mould, that has been well meliorated and prepared some time before. The cuttings being then prepared for planting, by the bottom part being cut perfectly smooth; if any of the old dead snags remain, they should be cut off close to the quick wood, and the top cut sloping towards the back of the hot-house or frame, when placed in them. Mr. Forsyth recommends "planting only one cutting in each pot, which as to size should be a deep forty-eight; by that means he thinks the plants will grow much stronger and quicker than when many are crowded together, and the sun and air will have a freer admission to ripen the wood; for, when many are planted in one pot, they shade one another, and in a considerable degree prevent the sun and air from passing freely among them. When the plants begin to get strong, and the pots full of roots, it will be necessary to shift them from the forty-eights to thirty-twos." "This mode is," he says, "best adapted for private gardens; but for nurserymen, &c., who raise plants for sale, and cannot conveniently spare so much room, it may be necessary to plant three or more cuttings in each pot."

And in these cases the same rules for watering, transplanting, shifting, &c., are to be attended to as was directed for the seedling plants.

Mr. Forsyth observes, that it is "a method very frequently practised by nurserymen and gardeners, when they wish to have their plants fit for sale the same year, to plant them in pots, and place them in the hot-house among the tan, on the flues, or round the curbs of the pit. And he has seen it employed with great success. In this way they may," he says, "be raised either by planting them singly in small pots, or several in a pot, according to its size, planting them out separately when they have taken root, having a hot-bed ready to plunge the pots in as soon as they are transplanted. In this manner they be-

come much forwarded in their growth, and are before the autumn in a state fit for sale."

In raising vines in the layer manner, the method usually made use of is by stools, in the open quarters of the garden, in the same manner as nursery-men propagate forest-trees and shrubs: but the best way, according to Forsyth, is to take layers from these on walls or palings, training the shoots at full length during the summer; when about the month of February some of the finest and strongest shoots should be chosen, laying them across the foot-path into pots (twenty-fours or sixteens) filled with fresh mould, and plunging them in the ground about two inches below the surface; at the same time making an incision or two in the old wood, or giving it a twist just below a joint; and though they will generally take without notching or twisting, it is nevertheless advised, as the surest way, to have that done. The layers should then be cut, leaving two or three strong eyes upon each. And when the shoots begin to run, they should be tied to long stakes, to prevent their being broken by the wind; all the runners and side-shoots being picked off, leaving only two or three fine strong shoots on each plant, which should be trained at full length during the summer season.

As soon as the shoots are laid down, it will be necessary to mulch them with good rotten dung, or rotten leaves, which will keep the mould moist; and in very dry summers, a good watering should be given once or twice a week: this will wash in the dung or leaves about the roots, and induce the layers to shoot with more vigour. Mr. Forsyth says, "that in this method of laying, two or three rows of layers may be had from one wall: taking care to lay the branches alternately, and to keep the pots plunged about two inches below the level of the ground."

The same writer advises in choosing vines from the nursery, to select "those which have the strongest and longest shoots."

He observes that where the above directions are properly attended to, the plants will be well rooted in the pots before autumn, and fit for planting in vineries, hot-houses, or other situations. And when they are to be planted out, they should, he thinks, be carefully cut off from the mother vine and carried in the pots to where they are intended to be planted; taking care to preserve the balls as much as possible when they are turned out of them.

It is added that "if the season be warm and fine, the grapes of the early kinds ripen very well on these layers before they are taken up; and, if properly managed, they will bear some fruit the first year after planting. One of the

strongest shoots must, he says, be left nearly at full length, cutting it as high as the uppermost full bud, leaving nothing but round well-ripened wood. If there are three shoots, the remaining two should be cut so as to leave only two full eyes upon each, which should be trained at length, as before directed, to produce fine wood for the next year. The shoot which was trained the preceding year should then be cut down, leaving only two strong eyes to produce wood for the following year; and so on every year, cutting the branches alternately: by this means the walls always may be kept covered with fine healthy bearing wood, and a great deal of time be saved in furnishing hot-houses, vineries, and other places. It is remarked that "this method of laying is practised with great success, by many nurserymen in the neighbourhood of London."

In the producing of vines by grafting, choice should be made of cuttings for grafts, or scions, from the best-bearing branches of the sorts intended to be propagated at the season of pruning. In general the bottom part of the last year's shoot is to be preferred; but in well-ripened vigorous wood, any part of the shoot will answer, provided it be not too long jointed. These cuttings should be preserved in pots filled with light sandy earth till the time of grafting.

The periods for performing the operation are different according to the vines; for those in the pinestove, the beginning of January may be proper, but the middle of March for those growing in the open air. In general they should be grafted about three weeks before they begin to break into bud. And upon small stocks not more than an inch in diameter, cleft-grafting is the most proper; but upon larger stocks, whip-grafting is to be preferred. In both methods care should be taken in fitting the stock and scion together, and the operation should be performed with great exactness; fastening them together with bass matting, and covering them with clay in the usual way. After the operation the scion will sometimes begin to push in a few weeks, but it frequently remains dormant two or three months; during this period the stock must be stripped of all its shoots as soon as they appear; and to preserve the scion in a vegetative state, the clay must be kept moderately moist, by wrapping wet moss round it, and by keeping the moss constantly sprinkled with water. And when it has made shoots five or six inches long, the clay and bandage must be carefully taken off.

The method of grafting by approach is advised by some, however, as the best mode of raising vines. In this case it is necessary to have the plant intended to be propagated, in a pot.

Strong plants, that have been two or three years in pots, are to be preferred; but plants from the nursery may be potted, and grafted in the same season, if brought into a hot-house or vinery. It is suggested that fine grapes and good wood may be obtained even the first season, by any of these methods, but particularly by the last; in which it is evident the graft has a double support, as from the stock, and the plant in the pot.

In this sort of grafting the clay and bandage should remain two or three months after the graft has formed an union; for, if it be taken off sooner, the graft will be very liable to spring from the stock. The pot should be plentifully supplied with water till the month of August, when the graft should be separated from the plant in the pot. Two or three inches of wood below the bottom of the graft may be left, but should be taken clean off at the next pruning in winter.

The Syrian Vine is recommended as the most proper for stocks, and plants of this sort raised from seeds are greatly preferable for this purpose to plants raised either from layers or cuttings.

The principal advantages of the grafting mode of raising vines are; that if a wall should have been planted with bad kinds, instead of stubbing them up, and making a new border, by which several years must elapse before the wall can again be completely filled, in this way their nature may be changed immediately; as good grapes may be obtained from the same year's graft; and in a hot-house the grafts, if permitted, will frequently shoot thirty or forty feet the first summer; that in small vineries or frames, where great variety could not be had in the common way, it may be procured by this means on the same plant;—and that of the improvement of the various kinds, particularly the small ones, which generally make weak wood. The method by inoculation may likewise have advantages in some cases of a similar kind.

When any of the vines that have been raised from seed do not prove of a good flavour, they are proper for grafting or inarching the finer sorts of vines on; for, as the coarser sorts grow more vigorously than the finer, they are, on that account, more fit for grafting or inarching.

It is remarked, that "the best manure for vines is a mixture of vegetable mould, rotten spit-dung, and fresh loam (turf and all); this should be thrown in a heap, and frequently turned, for a year or two before it is made use of."

Pruning and Training Vines.—In the management of the vines after being thus raised and

trained, as they rarely produce any bearing shoots from wood that is more than one year old, care should be taken to have such wood in every part of the trees; for the fruit is always produced upon the shoots of the same year, which come out from buds of the last year's wood. The method practised by gardeners is to shorten the branches of the former year's growth, down to three or four eyes, at the time of pruning; though some leave these shoots much longer, and think that by this practice they obtain a greater quantity of fruit: but what is gained in quantity is probably lost in quality; therefore the best method is perhaps to shorten the bearing shoots to about four eyes in length, as the lowermost seldom is good, and three buds are sufficient, as each will produce a shoot, which generally has two or three bunches of grapes: so that from each of those shoots there may be expected six or eight bunches, which is a sufficient quantity. These shoots must be laid in about eighteen inches asunder; as where they are closer, when the side shoots are produced, there will not be room enough to train them against the wall, which should always be provided for; and as their leaves are very large, the branches should be left at a proportionable distance from each other, that they may not crowd or shade the fruit too much.

In the winter pruning of the vines, it is advised to make the cut just above the eye, sloping it backward from it, that, if it should bleed, the sap may not flow upon the bud; and where there is an opportunity of cutting down some young shoots to two eyes, in order to produce vigorous shoots for the next year's bearing, it should always be done, as in stopping of those shoots which have fruit upon them as soon as the grapes are formed, which is frequently practised, it often spoils the eyes for producing bearing branches the following year. The usual season for this pruning is the end of October.

About the end of April, or the beginning of the following month, when the vines begin to shoot, they should be carefully looked over, rubbing off all small buds which may come from the old wood, which only produce weak dangling branches; as also when two shoots are produced from the same bud, the weakest of them should be displaced, which will cause the others to be stronger; and the sooner this is done the better. And in the middle of the last month they should be gone over again, rubbing off and displacing all the dangling shoots as before, and at the same time fastening up all the strong branches, so that they may not hang from the wall; for, if their shoots hang down, their leaves will be turned with their upper surfaces the

VOL. II.

wrong way, and when the shoots are afterwards trained upright, they will have their under surface upward; and until the leaves are turned again, and have taken their right position, the fruit will not thrive; so that the not observing this management will cause the grapes to be a fortnight or three weeks later before they ripen: besides, by suffering the fruit to hang from the wall, and be shaded with the closeness of the branches, it is greatly retarded in its growth; therefore during the growing season you should constantly look over the vines, displacing all dangling branches and wild wood, and fasten up the other shoots regularly to the wall; and towards the middle of June the bearing branches should be stopped, which will improve the fruit, in doing which three eyes should always be left above the bunches. But though this is practised on those shoots which have fruit, it is not to be performed upon those which are intended for bearing the next year, as these must not be stopped until the middle of July, as by stopping them too soon it may cause the eyes to shoot out strong lateral branches, and in that way injure them. In the summer season care should be taken to rub off all dangling branches, and train up the shoots regularly to the wall as before, which greatly accelerates the growth of the fruit, and admits the sun and air more freely to them, which is necessary to ripen and give the fruit a rich flavour; but the branches should not be too much divested of their leaves, as is the practice with some.

Mr. Forsyth has, however, attempted another mode of pruning and training vines, from trials made on vines planted against the piers of a south wall, among peaches, nectarines, and plums, &c., in which the fruit was so small and hard as to be unfit for the table. They had been trained upright, which induced such a luxuriance of growth as made the sap to flow into the branches in the place of the fruit. "He let," he says, "in 1789, two strong branches grow to their full length without topping them in the summer, and in the following year trained them in a serpentine form, leaving about thirty eyes on each shoot, which produced one hundred and twenty fine bunches of grapes, weighing from one pound to a pound and a quarter each. Every one that saw them said that the large ones were as fine as forced grapes; while the small ones produced from branches of the same vine, trained and pruned in the old way, were bad natural grapes, and not above twice the size of large currants. And in order more fully to prove the success of the experiment, he next year trained five plants in the same way, allowing the shoots intended for bearing wood to run

3 U

to their full length in summer, training them wherever there was a vacancy between the old trees; where there was none, he ran them along the top of the wall, without topping them. In winter he trained them in a serpentine manner so as to fill the wall as regularly as possible; they were, he says, as productive as those in the former year. And after a three years' trial, he thought he was warranted to follow the same practice with the whole; when in the year 1793 he sent, he says, for the use of his majesty and the royal family, three hundred and seventy-eight baskets of grapes, each weighing about three pounds, without planting a single vine more than there were the preceding year, in which he was able to send only fifty-six baskets of the same weight; and those so bad and ill-ripened that he was ashamed of them, as they were not fit to be sent to the table."

This, he thinks, sufficiently proves the great advantage that the serpentine method of training possesses over the common method. He advises that the shoots should be brought as near as possible from the bottom of the vine, that the wall may be well covered. When the walls are high, and the shoots from the serpentine branches strong, they are sometimes let remain; but if the walls are low, and the serpentine branches produce weak shoots, they are cut out in the autumnal pruning, and the strongest of the young wood trained up in their room.

As the size and fineness of the bunches of grapes depend in a great measure on the bearing wood being strong and well ripened, great attention should be paid to these circumstances. Where the vines produce small bunches, they should be cut down to two or three eyes, in order to have strong wood for the ensuing year. And as it has been seen that vines bear their fruit on the wood that was produced the preceding year, when there is a great deal of old naked wood on them, as generally is the case, with some small weak shoots at the extremities, they should always be cut down as near to the ground as possible, in which case there will be no fruit for that year. But another mode is sometimes practised, which is to cut every other shoot, leaving the old ones to produce some small grapes; when in the following year there will be plenty of fine wood, provided care be taken to nail in the strongest shoots, and pick off all the side-shoots that are produced from the eyes, pinching them off with the finger and thumb, or cutting them out with a sharp penknife close to the bud or eye; but never twisting them; as by twisting them the bud that produces the grapes the next year is hurt; being always attentive to cut as near to a bud as possible, and taking care to

lay in the wood very thin in the summer season, that the sun and air may be freely admitted to ripen it well, as by these means it will grow very strong. Great care should also be taken to keep the shoots nailed to the wall, which will prevent their being broken by high winds; picking off all the side-shoots every time they are nailed, which should be done several times during the summer months, according to the quickness of their growth. In fine weather they grow so very rapidly that it is necessary to look them over once every fortnight or three weeks to have them in good order. The vines should never be suffered to run together in a cluster, and mat, as it infallibly ruins them for bearing the succeeding year. The shoots that have been trained in a serpentine manner, are advised by Mr. Forsyth to be topped, as soon as the grapes come to the size of very small green peas, at a joint or two above the fruit; but neither the leading shoot, nor that which is intended to bear fruit the next year, should ever be topped.

In the second year Mr. Forsyth never recommends "the pruning of vines to be performed till the beginning of February, except in such seasons as are very forward. It is, however, the common practice with some to begin pruning soon after the fall of the leaf, before the wood becomes hard; but if a frost sets in before the wood is hard, in particular after wet summers and autumns, it is apt to be very much injured; he has frequently seen it almost killed after autumnal pruning. And he observes that there is often fine weather in the months of October, November, and December, with sun and drying winds, which helps to ripen the wood after wet autumns."

It is advised, "when the vine leaves begin to fall, to take a soft broom and sweep them off upwards in a gentle manner, which will be of great service in assisting to harden the wood." In beginning to prune in February, it is recommended always to make choice of the strongest and longest shoots, leaving them as long as the eyes are found good and plump, and the wood round; but by no means to leave them when they become flat, as in that case they seldom bear fruit; and if they do, it will be very small. Mr. Forsyth never lays in any that has less than fifteen, and from that to thirty good eyes, according to the strength of the shoot, which will produce two bunches from every good eye. He has had seventy bunches of grapes from one shoot. The shoots that have borne fruit in the preceding year should be cut out the next year, except where the wall is to be filled and the shoots are very strong. Plenty of fine healthy young wood is easily provided, if care be taken

in the winter pruning; therefore, none should be left but the fine strong wood, cutting constantly at the second, third, or fourth eye; rubbing the lowest bud off, and that which comes out at the joint between the new and last year's wood. By these means as much fruit will, he says, be procured from these short shoots as by the common way of pruning. It is necessary to leave two or three of the strongest shoots for next year's bearing wood, and never to top them. When there is not room to train them, they may be led over the tops of the other trees, if the vines are planted against piers; or be run behind the standards, if there be any, which is generally the case where the walls are high. In this way all the wall will be covered, which will have a very beautiful appearance when the fruit is ripe, besides furnishing a plentiful supply of fine grapes. The shoots at the bottom of the wall may be run behind the dwarf trees, or be tacked down over the top of the wall on the other side where the walls are low. Mr. Forsyth has had very fine grapes on east and west walls, in good seasons, between peaches, plums, &c., particularly when the trees are young. In these cases he advises to "keep cutting in the vines as the other trees grow and fill up the walls. He also trains them over the tops of trees on each side; which, he says, never does any harm to the trees below, provided they are kept nailed to the wall. He has also planted vines between trees on north and east aspects, and trained them over the tops of the south and west walls to fill the upper parts, till the peaches and nectarines cover them." He then cuts away part of the vines, leaving only as many shoots as he may think necessary. "Two years ago, he says, he removed some old apricots that covered a wall about one hundred and sixty-five feet long, and planted them against a new wall, leaving five vines that were planted against the piers. These five plants have, in the course of two years, covered the above wall from top to bottom, and bear plenty of fine grapes every year. He says he also moved an old vine on a wall near to the above, and cut it in pretty close, when it has in three years spread twenty-six yards, and bears very fine fruit. And against one of the piers had, he says, been planted a black Hamburg grape, and at the other side of the same pier a Muscadine, at the distance of about two feet from each other; he pruned them both according to his method, and the second year after, they produced one thousand one hundred bunches of fine grapes." It is added "that he also tried an experiment by taking some shoots from a south wall, opening the ground

deep enough to lay them in across the footpath at the distance of about four feet from the wall, and tied them to stakes, training them as espaliers, laying in the wood as directed for walls, and keeping them as low as possible, that they might not shade the bottom of the wall; he also pruned them as he does those against walls, laying the shoots in very long, except those that were intended to bear fruit next year, from which he took off all the side-shoots and runners against the wall and espaliers. In a favourable season these bear, he says, very fine fruit, better than what is got from the walls by the old method of pruning."

The use of the composition is advised as soon after pruning as possible; for, as the vine is very porous, it soon imbibes the wet and moisture, which brings it quickly to decay. He adds, that "if at any time a vine should be cut late in the season, it will be apt to bleed much; in which case the powder should be applied, repeating the application till the bleeding stops." He states that he "cut two strong vine-branches in the month of June, and three more in July, in very hot weather, on purpose to try the effect of the powder in stopping the bleeding. The sap rose so strong that it worked out at the top in a froth; he applied the powder, which in a short time entirely stopped it." These directions are chiefly for vines on the natural wall, though the same method has been advised to be practised for forced grapes.

Grape-vines require a dry light soil, and such a situation as has a full south aspect.

Mr. Forsyth advises, "after the grapes are set and begin to swell, to water them with the barrow engine, sprinkling them all over the leaves and fruit, pressing the fore finger over the top of the pipe; by which the water can be thrown as fine as small rain, which will wash all the dust off the vines and leaves, that are frequently covered with it, especially where the garden is near a public road. The insects should likewise be washed off the trees. In fine weather he sprinkles all the wall-trees three times a week, which keeps them clear from insects, and promotes the swelling of the fruit; but this operation must never, he says, be performed when the nights are cold and frosty. The sprinkling of the trees should be begun when the sun is in an oblique direction, or gone off the wall, which may be about four o'clock on a south aspect; as by doing it at this time the leaves will have time to dry before night, and so prevent the frost, if there should be any in the night, from injuring them. In very hot and dry weather the trees should have a good bottom watering once

a week, which will forward the swelling of the fruit. Vines require a great deal of watering; but when the fruit is fully swelled, you should leave it off, particularly when the nights begin to get cold, as it would hurt the flavour of the fruit.

"In order to preserve the grapes, as soon as the large fly makes its appearance, plenty of bottles a little more than half filled with some sweet liquor should be provided to entice the flies to enter them, where they will be drowned. The bottles should be hung on the nails at proper distances all over the vines, and also some of them placed at the bottom of the walls. The blue fly comes much earlier than the wasp, and is no less destructive to the fruit. It is therefore necessary to hang up the bottles betimes, in order to destroy as many of them as possible before the wasp makes its appearance, to have the bottles ready for this second enemy.

"When the grapes begin to ripen, the birds begin to attack the fruit; when it is necessary to bag some of your fine handsome bunches, but to bag them all would be an endless trouble where there is a full crop and a large garden.

"Of course where the bunches are very thick, the quickest way is, he says, to cover the trees with nets, or buntine (a kind of stuff of which ships' colours are made), which will admit a free air to the grapes, and dry soon after rain. They will also in the spring, he thinks, be a good covering for the trees, in cold, wet, or snowy weather. The bunches of grapes should always be kept under the shade of the leaves till they begin to ripen; when you may begin to pick off the leaves which cover the fruit (leaving those a little above it to be a shelter from the wet and frost in the nights): this will assist the ripening of the fruit; and take off only a few leaves at a time, according to the quantity of grapes to be gathered at once; by these means the fruit will continue three times as long in succession as it would if the leaves were picked off all at one time. He has often seen all the leaves taken off from the fruit soon after it was set, which prevents it from swelling, and it becomes hard and small, and generally cracks. When the leaves are not too thick, they admit, he says, the rays of the sun to pass through, and a warm glow of heat will be reflected from the wall.

"It is often convenient to let the grapes hang as long on the walls as possible; he has often let them hang till the middle of November, only covering them with nets, or buntine. But when the frost begins to set in sharp, they should then be gathered. Where there are several bunches on one branch it may be cut off, leaving about six inches in length, or more, of the wood, ac-

cording to the distance between the bunches, and a little on the outside of the fruit at each end; both ends being sealed with some common sealing-wax, such as wine merchants use for sealing their bottles with, which you may buy at the wax chandler's; then hang them across a line in a dry room, taking care to clip out, with a pair of scissors, any of the berries that begin to decay or become mouldy, which if left would taint the others. In this way he has kept grapes till the sixth of February; but if they are cut before the bunches are too ripe, they may be kept much longer than that period.

"They may also, he says, be kept by packing them in jars, (every bunch being first wrapped up in soft paper), and covering every layer with bran, which should be well dried before it is used, laying a little of it in the bottom of the jar; then a layer of grapes, and so on, a layer of bran and of grapes alternately, till the jar is filled, then shaking it gently, and filling it to the top with bran, laying some paper over it, and covering the top with a bladder tied firmly on to exclude the air; when the top or cover of the jar should be put on, observing that it fits as close as possible, placing them in a room where a fire is kept in wet or damp weather."

Forcing of Vines.—This is performed in different sorts of buildings, contrived for the purpose; such as hot walls and vineries, as well as by hot-houses or stoves. See VINERY.

In the former cases, when the borders have been prepared and made up in the manner directed under the head Vinery; when proper plants of one or two years growth in pots cannot be procured, cuttings, Mr. Nicol says, should be made use of. Others, however, prefer cuttings in all cases, planting two in each hole, to guard against failure, the weakest, where both grow, being afterwards removed. These should be planted about the beginning of April, being chosen from good bearing vines, and such shoots as are well ripened, otherwise they never make good plants. The distance they should be allowed to remain is about six feet. In planting them out, holes should be opened with a spade, about eighteen inches deep; the cuttings being laid in the holes a little sloping, the earth being then filled into the holes, and gently pressed with the foot to them, and raised in a heap so as just to cover the uppermost eyes, afterwards applying a little mulch on the surface of the ground about them to prevent the sun and air from drying the earth; and when the spring is very dry, a little water should be given once a week.

Under this management they usually make strong shoots the first summer.

Mr. Nicol, where rooted plants are employed, advises the pits to be half filled with vegetable mould, and the plants to be carefully taken out of the pots with thin balls entire, and, unless when rooted, be placed in that manner in the pits, filling them in with vegetable mould, and settling them with a little water. This work, in his opinion, may be performed any time from the beginning of November to the first of March with equal success.

But though the above distance of planting may be proper when the vines are full grown, it may be beneficial to have them put in at half that distance at first; as a crop or two may be obtained before it is necessary to thin them out; two of a kind being placed together for the greater convenience of thinning.

The management of the vines, for the three first years after planting, is the same as practised for those against common walls, which has been described above, being, however, encouraged as much as possible, and the shoots not left too long, or too many in number on each root, that they may be duly ripened and prepared for bearing the fourth year, which is the soonest they should be forced: when any sorts of fruit-trees are forced by fire too young, they seldom continue long in health; so that what fruit they produce is small, and not well-flavoured.

By the middle of June the grapes will be almost full grown, therefore the glasses may be kept off continually in the day time, unless the season be very cold and wet, in which case they must be kept on, and only opened when the weather is favourable; for as the racy vinous flavour of these fruits is increased by a free air, so during the time of their ripening they should have as large a share as the season will admit to be given them.

Mr. Nicol advises "in the first and second seasons, to keep the border in a moderately moist state while the plants are growing; but, after their growth begins to abate, particularly the second season, to withhold the waterings by degrees till it is quite stopped, in order to make them harden and ripen their shoots for the production of a crop the third year. Water frequently with the drainings of a dunghill. And wash with the hand engine twice or thrice a week in the evening, in order to refresh and keep the plants clean. Steaming is, he thinks, unnecessary.

"In the third season, keep the border also in a moderately moist state, till the fruit begin their last swelling. Then give large quantities till they begin to colour; after which, entirely withhold it till the crop is gathered; and then give two or three hearty waterings, to recover the

state the border ought to remain in for the winter."

He likewise advises "to wash twice or thrice a week till the flowers begin to open, then to withhold till the fruit is fairly set; washing again till they begin to colour, and then withhold entirely for the season. And in the interim of washing, to steam every night when the fire is at the strongest, by pouring water on the flues till you cannot see an object at the distance of two or three yards: and repeat this early in the morning, if the temperature of the house require the making of fires, or if there is a sufficient heat in the flues to produce it, even in a middling degree."

The insects which infest the grape house are chiefly the green fly, thrips, red spider, and wasp. The two first are, Mr. Nicol says, "easily destroyed by a fumigation of tobacco; the third is kept under by the engine in summer; and the last, by the destruction of their nests, phials filled with honey and water, or sugar and small beer, and bird-lime. All these methods are, however, sometimes ineffectual for the destruction of wasps where they abound in vast quantity; and their fondness for grapes renders it sometimes necessary to inclose the bunches in bags of gauze, or silken paper, which is a misfortune; as the grapes, by being so much excluded from the action of the sun and air, fall greatly off in flavour."

Birds must also be guarded against by some means or other; such as have been mentioned above.

All sorts of grapes should continue on the trees till fully ripe.

It is advised by some, that these vines should not be forced every year, but under good management every other year, or every third year. Of course, in order to have a supply of fruit annually, there should be a sufficient extent of walling to contain as many vines as are necessary for two or three years; and by having the frames in front moveable, they may be shifted from one part of the wall to another, as the vines are alternately forced. These hot-walls are commonly planted with early kinds of grapes, in order to have them forward in the season; though some think it hardly worth the trouble, in order to have a few grapes earlier by a month or six weeks, than those against common walls. The sorts of vines most useful in this mode of culture have been mentioned above.

After these vines are grown to full bearing, they must be pruned and managed after the same manner as has been directed for those against common walls, with this difference only, that in those seasons when they are not forced,

together till it is uniformly mixed. Where sandy loam cannot be had, common sand may be used; and the mould of rotten sticks or old woods, or from hollow trees, may be substituted for the decayed leaves.

"When the border has been prepared, if the weather permit, the vines may be planted at the end of February or the beginning of March, in the front of the hot-house or stove; having first taken the precaution to put a little moss round the upper part of each stem, with two or three folds of paper over it; tied with bass matting, to prevent the eyes from being injured in putting the plants through the holes in the wall. A hole two feet over, and one foot deep, should be made opposite to each rafter and close to the front wall, making the mould taken out of the holes fine, and adding a little of the compost. Then turn the plant carefully out of its pot, and put the upper part through the hole. If the shoot just reach the bottom of the rafter, when planted, it is sufficient; but as the earth may settle a little, it is better to allow two or three inches more. In closing the mould to the plant care should be taken to preserve the roots, their fibres being exceedingly brittle. Lay a thin coat of rotten dung over the mould, and give the plant a gentle watering; then take off the bandage, and fasten the top of the shoot to the rafter. Only one shoot should remain on each plant. Two may be left for a time; but when one is secure, the other must be taken off, but not close to the old wood, as that would occasion it to bleed, and greatly injure it."

It is observed that "from the time the vines begin to grow, they will require constant watering, especially in dry weather, and before the roots have penetrated sufficiently deep into the border or earth in which they are planted. It is the common practice, in these cases, to train a shoot up to each rafter; and if the rafters be not a sufficient depth to keep the leaves of the vines from touching the glass, to have iron pins of about nine inches in length, fixed at proper distances under each rafter; which should have a small hole or eye at the bottom, through which a small iron rod or strong wire should be thrust, for the support of the branch, which pins or wires should be painted."

Mr. Forsyth, however, remarks that when vines are trained straight up the rafters in this manner, they only throw out a few eyes at the top, the rest of the branch being naked; he therefore advises the serpentine method as much preferable.

The plants often show fruit at one year old, but it should not be suffered to stand, except a single bunch, to ascertain the sort. In the summer season the shoots should be constantly

trained, keeping them regularly fastened to the rafters; divesting them of their wires and lateral shoots; and guarding them well against the red spider and other insects.

The vines may in general be suffered to run two-thirds of the length of the rafters before they are stopped; and those which grow remarkably strong, the whole length. When these shoots are stopped, which is done by pinching off their tops, they will, in general, push out laterals, at three or four eyes on the upper part of the shoot, which should be allowed to grow twelve or fourteen inches before their tops are pinched off; when these in their turn will push out other laterals, which should be pinched off at the second or third joint; and thus the sap may be diverted till the end of the season.

When the leaves begin to fall is the best season for pruning. In the first season, supposing the vines to have grown with equal vigour, the shoots may be pruned alternately to three, four, or five eyes, or about twenty feet; but when they have grown moderately strong, the shoots should be pruned down to about eleven feet; as by this alternate pruning the former shoots will make fine wood for the succeeding season, and the latter will produce a crop of fruit; after which, these fruit-bearing shoots must all be cut down nearly to the bottom of the rafters. But when any of the plants appear weak, and have not made shoots more than eight, ten, or twelve feet long, it will be proper to prune every shoot down to two, three, or four eyes. In performing the work the shoots should be taken off with a clean sloping stroke, about half an inch above the eye, making choice of a bold eye to terminate the shoot, and fastening it to the rafter in a complete manner.

The vines in pine-stoves begin to make weak shoots early in January; the house being then kept warm on account of early crops raised in most hot-houses. But when it is kept to a proper degree of heat for pines during the winter months, they seldom begin to push till about the middle of February. It is usual for them to push only towards the ends of the shoots, the other eyes remaining in a dormant state, and causing a long space of naked wood; but to make them push more generally, as soon as the sap is in motion, the house should be kept for a short time a few degrees warmer than usual. In the morning the thermometer should be 5° or 6° above temperate, and in the day-time the house be kept as warm as the weather will permit. It will also be necessary to guard the stem of the vine on the outside against frost; for one severe night would greatly injure, if not totally destroy, the hopes of a crop. This may be done by

wrapping the part exposed round with moss, fastened thick with bass matting; which covering should remain on till spring frosts are over, and then the stem be washed well to clean it. The vines should be divested of the least promising and supernumerary shoots as soon as possible, and great care should be taken not to leave too abundant a crop; as a few bunches in a high state of perfection are preferable to many in a poor state.

At the time of flowering, should the weather prove hot and dry, with brisk winds; to prevent the berries of different sorts from falling off at the time of their setting, it is proper to water the roots of the vines plentifully, to keep the house as close as the weather will permit, and to water the walks and flues in the hot-house constantly, especially late in the evening, when the glasses should be immediately closed, by which a beneficial sort of dew is produced.

In these situations, when the grapes are at their last swelling, are becoming transparent, and change from green to red or black, and till they are nearly on the point of being ripe, plentiful supplies of water, especially if the season prove hot and dry, should be given to the vines.

After the fruit is cut, no other management is required till the pruning season, but that of taking off the lateral shoots in the same manner as in the preceding case. But in the next winter's pruning all the vines that produced a full crop of fruit, should be cut down nearly to the bottom, that is, to the lowermost summer shoot, which should also be cut down to the first or second eye; while all those that were cut down nearly to the bottom the preceding season, and which will, in general, have made very strong wood, must be left to the length of twenty-one or twenty-two feet each, with the intention of producing a full crop of fruit the following season.

The management of them during the next summer will be nearly the same as in the preceding; only, as they have increased in strength and size, they will be enabled to produce and support a larger burthen of fruit. But the crop should always be proportioned to the size and vigour of the plants; but whilst they are young, great moderation should be used as to the number of bunches that are allowed to stand and ripen. They should be well thinned when the berries are about the size of a small shot. And the main shoulders, as also the less projecting parts of the bunch, should be suspended by small strings to the rafters, and every part raised to a horizontal position. In thinning the berries, great care should be taken to leave all the most projecting ones on every side of the bunch.

VOL. II.

In very close-growing bunches it will be necessary to clip out more than two-thirds of the berries; in some, one half; but in the loose-growing kinds, one third is generally sufficient. By this means the remaining berries will swell well, grow to a great size, and not be subject to rot; as they are apt to do in a hot-house, when they are wedged together in a close manner.

It is observed that "not only the rafters or roof of the hot-house, but the back wall also above the flue, may be furnished with fruit. For this purpose, let every fourth or fifth vine-plant be trained in one shoot quite to the top of the rafter, and then directed sideways ten or twelve feet along the top of the back wall. At the winter's pruning, bring down that part of the shoot perpendicularly, and cut it off at one foot above the top of the flue. The next spring encourage only two shoots from the two extreme or lowermost eyes of each shoot so brought down, and train them in a horizontal direction one foot above the top of the flue. These shoots, however, will grow with greater readiness, if they are trained upwards during the summer; and they may easily be brought to the desired position at the next winter's pruning. They will then form against the back wall the figure of the letter T inverted. And in the next season the horizontal shoots will produce new wood from almost every eye, provided all the shoots be pinched off from every other part as soon as they appear;" laying in the shoots from one to two feet apart, according to the kind of vine. It is advised in these cases, to "train all the shoots in a perpendicular direction, and, provided they are strong and vigorous, to suffer them to grow to the length of five or six feet before they are stopped; but all these must be cut down to two or three eyes at the next winter's pruning." And "only one shoot should be permitted to rise from each spur the following season; and although they will in general be sufficiently strong, and produce two or three bunches apiece, yet only one bunch should remain on each shoot: these will then be large and fine, and the wood will be greatly benefited by such practice. But these shoots must be pruned next winter very differently. One shoot must be left four feet, that next it only a few inches long, and so alternately." It is added that "the vines on the rafters will require a management in future seasons nearly similar to that described above; and though it may not be advisable to prune them alternately so near to the bottom of the rafters as was directed for the two preceding seasons, it will be frequently found necessary to cut an old shoot down to the lowermost summer shoot, as near to the bottom of

3 X

the rafter as can be. The side shoot on the other rafters should not be permitted to ramble over the adjoining lights; but at the end of every season it will be proper to cut such shoots down to the second or third eye next the old wood, provided the bottom eyes are bold and strong: this must be done not only to strengthen the vines, but also to prevent the roof of the house from being too much crowded with old wood. Whilst the vines are young, one rafter will suffice for a vine-plant; but when they become older, they will require a larger space; especially the strong-growing kinds, which produce large leaves and bunches. It will be proper therefore to train shoots sideways on the wall-plate, from the stem of the plant, immediately at its entrance into the house. These shoots should be carried up the adjoining rafters, and the plants growing against such rafters must be taken entirely away; except it should happen that the plant growing against such rafter is trained forward to furnish the back wall. And when a vine-plant occupies two or more rafters, it will be right to prune occasionally, particularly whilst the vine is young, one or more of such shoots down nearly to the bottom of the rafter, as this will not only contribute to strengthen the plant, but afford means to furnish the rafters with a succession of young wood." When the shoots are thus conducted to different rafters, every one may be considered as a separate plant, and be trained up in one shoot; requiring management similar to that mentioned above.

Mr. Nicol, however, rejects the method of planting the vines on the outsides of the houses, and his reasons are these: "first, he thinks it unnatural that one part of a plant should be as it were in Greenland, and the other in the West Indies; and secondly, because he is convinced that no plant (especially the Pine) will live and thrive as well under the shade of another, as when exposed to the free sun and air." To obviate these objections, he plants the vines in the lobbies between the stoves and peach and grape houses; introducing them through the partitions, and training them horizontally on trellises fixed against the back walls and upright sashes in front. By which means he renders each of the stoves as good as any grape-house, without being in the least injurious to the pines.

In these cases, he says, "the front walls of the lobbies were built on pillars; and a border, both without and within, prepared for the plants, in the same manner as for the grape-house." It is added, that in one trial, "the second year after introduction into the stove, the plants completely filled the whole trellis; and a fine crop, the third year, gave a lustre and

richness to the house (in conjunction with a good crop of pines) highly gratifying."

He remarks that "the same methods in regard of watering, washing, and steaming, are to be practised here as in the grape-house. Air is admitted solely for the sake, and to answer the nature, of the pines; the temperature of the house is also regulated for their sakes. But the mode of training and pruning is very different from that in the grape-house. Here, you have it not in your power to bring on vegetation in that slow and regular manner as in the grape-house; and consequently, were the shoots to be laid in at as great lengths, they would only break perhaps a few eyes at the extremities, and the rest remain naked. This he found from experience to be the case; although it did not happen for the first three or four years, owing to the youth and vigour of the plants; but when they had exhausted themselves a little by bearing a few crops, they began to break their buds in the manner above stated. He therefore made it a practice to train them only to five or six feet in summer, and shorten them down to one or two in the pruning season; by which they generally broke all their eyes, and produced plenty of fruit." He further states, that in one house he tried, for two seasons, to produce crops by laterals; but found that method attended with more inconveniency than the above, from the difficulty of procuring a proper succession of strong shoots to produce the laterals, without which they bear very insignificant clusters. He also, in the other house, produced a second crop, for two seasons; but finding it to exhaust the plants very much, he discontinued it; the more especially, as, having so many compartments for grapes, the practice of it was the less necessary. The method is, he says, this: "Just about the time the fruit is half ripe, and when the under part of the shoot is also ripe to the length of about two or three feet, and the extremity of it in a growing state, shorten it at about two or three feet above the ripe part. It will push again, and will generally bring two clusters. Sometimes, also, the second and third eye will push, and bring a cluster or two. In winter pruning, shorten down the first, or spring-made part of the shoot, to two or three feet. This method may be repeated, he thinks, with pretty good success once in two or three years; but, if done every year, it will (in the course of three or four years) occasion the cutting of the plants down to the ground, in order to make them put forth a fresh stock of wood."

He adds that "in the event of severe frost, and the plants being in an early state of vegetation, the border on the outside should be co-

vered with a quantity of stable dung, or long litter, to prevent the roots from being injured by the weather. And unless the plants are wished to produce a second crop, they must not be pruned for good sooner than October; and at the same time, that operation should not be deferred longer than the first of November, lest, when they begin to vegetate, they should bleed. He concludes by observing, that grape vines will bear forcing, and last for many years, when under judicious management."

Besides these modes of cultivating vines, they are capable of being grown with advantages under hand-glasses, so as to produce a few bunches on each plant.

The second species requires artificial heat in this climate, and may be increased from seeds, obtained from abroad, which should be sown in small pots, and be plunged into a hot-bed of tanner's bark. When the plants come up and are fit to remove, they should be each planted out into a separate small pot filled with light earth, and plunged into a fresh hot-bed, shading them from the sun till they have taken new root; when they must be treated in the same way as other tender exotic plants, always continuing them in the stove, otherwise they will not succeed well.

The third should be planted against a wall, and treated in the same way as the common vine, being raised by cuttings or layers in the same manner.

The fourth sort is preserved in some gardens for variety; but it rarely produces flowers in this climate, and has not much beauty. It is increased by laying down the young branches in the spring, which mostly put out roots in one year fit to remove, when they may be taken off and planted out where they are to remain. These require support; and as their young branches are tender, and liable to be killed by frost, they should be planted against a wall, or pale, exposed to the south. The young shoots should be shortened down to two or three buds in the spring, which will cause the shoots of the following summer to be much stronger.

VOLKAMERIA, a genus furnishing plants of the exotic tree kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a one-leaved perianth, turbinate, five-cleft, nearly equal, acute; the corolla monopetalous, ringent: tube cylindric, twice as long as the calyx: border five-parted, nearly equal, flat: segments reflexed to one side, gaping chiefly on the upper side: the stamina have four filiform filaments, very long, on the gaping side of the corolla: anthers simple: the pistillum is a four-cornered germ: style filiform, length of the stamens: stigma bifid: one of the segments acute, the other indistinct: the pericarpium is a berry (drupe) roundish two-celled, four-grooved: the seed, nut solitary, two-celled, grooved.

The species cultivated are: 1. *V. aculeata*, Prickly Volkameria: 2. *V. inermis*, Ovate-leaved Smooth Volkameria.

The first is a shrub five or six feet high, branched, upright, the whole loaded with white flowers, which have no scent: the stamens most commonly five, but sometimes six, purple: the fruit brown. It is a native of the West Indies.

The second species has the leaves opposite, annual, petioled, bluntish: the peduncles from the upper axils, opposite, solitary, a little shorter than the leaf, three-cleft, three-flowered, more seldom simple and one-flowered: it rises higher than the first sort: the stem and branches are stronger, and grow more erect: the bark is very white: the leaves frequently grow round the branches in clusters or whorls: flowers on long axillary peduncles, supporting several flowers which generally stand erect. It is a native of the East Indies.

Culture.—These plants are increased by cuttings, which should be planted in pots filled with light good mould, in the summer season, plunging them in a moderate hot-bed, covering them close with hand glasses: when they are well rooted, they should be removed into separate small pots, replunging them in the hot-bed till they are fresh rooted; then gradually inure them to the open air in warm weather, continuing them in warm sheltered situations in the open air, till the approach of frosts, when they must be taken into the house where there is a moderate heat. They will not succeed in a common green-house.

They afford ornament among other more hardy stove plants.

WACHENDORFIA, a genus furnishing plants of the exotic flowering perennial kind, for the green-house.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx is a two-valved spathe: the corolla six-petalled, unequal: petals oblong, the three upper ones more erect, three lower spreading: nectary of two bristles at the inner sides of the upper petal: the stamina has three filiform filaments, declined, shorter than the corolla: anthers incumbent: the pistillum is a superior germ, roundish, three-cornered: style filiform, declined: stigma simple: the pericarpium is a subovate capsule, three-sided, obtuse, three-celled, three-valved: seeds solitary, rough-haired.

The species cultivated are: 1. *W. thyrsiflora*, Simple-stalked Wachendorfia: 2. *W. paniculata*, Panicked Wachendorfia: 3. *W. hirsuta*, Hairy Wachendorfia.

The first has a thick tuberous root, reed-like, of a deep-red colour, sending out many perpendicular fibres of the same colour, and spreading into several offsets: the leaves, which rise immediately from the root, are large, with five plaited folds; the biggest are two feet long, and three inches broad, of a deep green-colour: the flower-stalk rises from the centre of the heads between the leaves to the height of three or four feet, with leaves of the same form with those below, but narrower, and ranged alternately, embracing the stalk half round with their base: the flowers when young are enclosed in sheaths, which, after some time, open and make way for the flowers to come out; then they wither and dry, but remain upon the stalk like those of the yellow *Asphodel*: they form a loose spike, and there are several upon one common peduncle, which open one after the other: the upper flowers stand almost upright, but the lower nod; they are hairy and of a saffron colour on the outside, but smooth and yellow within. It is a native of the Cape.

The second species, when in flower, is a foot high: the root perennial, a little creeping, furnished with oblong cylindrical and nearly perpendicular tubercles: the leaves radical, two-ranked, sessile, equitant, vertical, spreading, dilated on the inner side at the base, channelled,

linear-lanceolate, pointed, entire, nerved, bright green, very like those of the first, but only one-third of the size, dying soon after the plant has done flowering, and not appearing again for some months: the stalk erect, cylindrical, bearing one or two small leaves, branched, many-flowered: general flower-stalks alternate, spreading, racemose, bearing from three to five flowers, cylindrical, downy: partial ones short, downy, all directed upwards, single-flowered. It is a native of the Cape.

The third seems chiefly to differ from the second in having hairy leaves, a more slender and taller stem, reddish-brown, and not green as in it; its branches more divaricate, the two upper lateral petals more contiguous, and its flowers when closed form a slenderer and more compact column: the incumbent anthers seem also to be shorter and rounder: the root-leaves oblong, lanceolate, three or four, about three or four inches high: the stem about three times their length: the segments traversed longitudinally on the outside by a brown hairy fillet; outer upper one wholly brown and pubescent outwards: the flowers scentless, opening in succession, closing towards evening: they expand in the month of July. It is a native of the Cape.

Culture.—These plants may be increased by offsets, taken from the heads of the roots, in the beginning of autumn, planting them in pots filled with soft loamy earth, mixed with a little sea sand, and when the season proves dry, placing them so as to have only the morning sun, until the offsets have taken new roots, when they must be placed in a sheltered situation, of as to have the full sun. On the approach so frosts, they should be placed in frames, and managed as plants of the tender kind.

The second sort is very impatient of cold, and seldom flowers in this climate.

They produce variety among other potted plants of the green-house kind.

WALK, a dry firm track in the garden or pleasure ground, which is formed of different sorts of materials; as gravel, sand, &c.; but where these cannot be procured, it is sometimes laid with powdered coal, sea-coal ashes, and powdered brick: these are, however, rarely used, when either gravel or sand can be procured. Where sea-coal ashes can be had,



Painted by Syd. Edwards.

London Published May 1860. by G. Kearsley Fleet Street.

Engraved by F. Sanson.

1 *Wachendorfia paniculata*.
Panicled Wachendorfia.

2 *Vitex nigundo*.
Five leaved Chinese Tree.

Digitized by Google

they are preferable to powdered coal or bricks, as they bind very hard, and never stick to the feet in frosty weather. And for wilderness walks they are before most other substances. There are likewise walks sometimes formed of turf, or what are called grass walks. In forming the first sort of walks, when they have been marked out, the earth should be taken away to a certain depth, that the bottoms may be filled with lime rubbish, coarse gravel, flint-stones, or other rocky materials, to prevent weeds from growing through the gravel, as well as to keep away worm-casts. It should be laid ten inches or a foot thick, over which the coat of gravel should be six or eight inches, which should be very fine, but not screened, the large stones only being taken out. When the gravel has been laid to this thickness, they must be exactly levelled, and raked true from all great drips, as well as little holes: by this means most of the stones will be raked under the feet, which may either be evenly sprinkled back over the last length that is raked, or buried in the bottom. Walks are frequently laid too round, so as scarcely to be walked upon with pleasure, and so as to lessen the effect of their breadth. The usual allowance for a gravel walk of five feet breadth, is about an inch rise in the crown: consequently, if twenty feet wide, it will be four inches higher in the middle than on each side; and for twenty-five feet, five inches, for thirty feet, six inches, and so on in the same proportion. When the walk has been carefully laid, trodden down, and raked, either in lengths, or the whole together, it should be rolled well, both in length and cross-ways; the person who rolls wearing shoes with flat heels, that he may not make holes; as, when these are once made in a new walk, they are not easy to roll out again. In order to lay them firm, it will be necessary to give them three or four rollings, after good waterings or heavy rains, as this will cause the gravel to bind, so that when they become dry they will be as hard as terrace. Iron-mould gravel is said to be best for binding, or such as has a little binding loam amongst it; which latter, though it be apt to stick to the heels of shoes in wet weather, nothing binds better in dry weather; and when the gravel is over-sandy or sharp, clay is frequently mixed with it, which, when cast together in heaps and well mixed, binds like a rock: loose gravel is very uncomfortable and uneasy to walk on.

Walks of this sort are not only necessary near the house; but one should always be carried quite round the garden, as being soon dry after rain, and proper for walking on in all seasons. See GARDEN PLAN.

Those about the house should be large, and laid out according to the nature and situation of the ground.

The walks laid with sand or other materials, in the other different parts of gardens or pleasure grounds, should be formed in the same manner, having regard to the nature of the soil, so as to render them as dry as possible at all seasons. The breadth in these walks should be in some measure according to the nature of the ground. Where this is small, five or six feet may be sufficient; but in large grounds much wider, as ten or twelve. In modern grounds of this sort, they are mostly laid out in winding serpentine directions, according to the nature of the sites, so as to have them concealed, and rendered as private as possible, by the trees and plants on their sides; the turns being contrived in as easy and natural a way as can be effected. See GRAVEL.

WALL, a sort of fence erection in gardens, built for the purpose of ripening all such fruits as are too delicate to be perfected in this climate without such assistance. Walls are built with different materials, as stone, brick, &c., according as they can be best procured, and at the cheapest rate. But for fruit-trees, brick is the best, as being not only the handsomest, but the warmest and kindest for the ripening of fruit, as well as affording the best convenience of nailing, for smaller nails will serve in them than in stone walls, where the joints are larger; and brick walls, with copings of free-stone, and stone pilasters or columns, at proper distances, to separate the trees and break off the force of the winds, make not only the most beautiful but the most profitable walls that can be erected.

Sometimes walls are built of mixed materials, as stones and bricks; but in this way they should be carefully built, or the brick front will separate from the stone behind.

Where walls are built entirely of stone, there should be trellises fixed up against them, for the more convenient fastening the branches of the trees: the timbers of these espaliers need not be more than an inch and a half thick, and about two inches and a half broad: these should be fixed across each other, at about four inches distance; for, if they are at a much greater distance, it will be difficult to fasten the shoots of the trees properly. As this trellis will be laid close to the wall, the branches of the trees will lie about two inches from the wall, in which position the fruit ripens better than when it lies quite close to the wall.

Many improvements have been attempted in building walls in different forms, as in semicir-

cular methods, in angles of various forms, and projecting more towards the north, to screen off the cold winds; but not any method has yet been found which succeeds so well as that of making them straight, and building them in an upright manner.

Other schemes of expediting the ripening of fruits on walls have been tried, such as painting them black, or of a dark colour, as the dark colour is supposed to imbibe more of the sun's rays, and retain the warmth longer. This has, however, on the same principle, answered better in theory than practice.

Walls, where substantially built, answer much better than those which are slight, not only in their duration, but also in their warmth. A wall two bricks thick will be found to answer better than one brick and a half; and if in the building of garden walls they are grouted with soft mortar, to fill and close all the joints, the walls will be much stronger, and the air not so easily penetrate through them, as it does through those which are built in the usual manner.

In respect to the aspect for walls in this climate, those which have one point to the eastward of the south are the best, as they enjoy the benefit of the morning sun more, and are less exposed to the west and south-west winds, which are very injurious to fruits, than those which are built due south.

And the next best aspect is due south, and after that the south-east. But as there will, for the most part, be south-west and west walls, these may be planted with some sorts of fruit which do not require so much heat to ripen them as those designed for the best walls: but wherever there are north walls, those will only be proper for baking pears, plums, and morello cherries, for preserving: or duke cherries may be planted against these walls, to continue them longer in the season.

The usual thickness of building walls with brick is thirteen inches, or a brick and a half; but this should be proportionable to the height: for, if they are built twelve or fourteen feet high or more, as is often practised, then the foundations of the walls should be at least two bricks and a half in thickness, and brought up a foot or more above the level of the surface of the ground, of the same thickness; then be set off two inches on each side, which reduces them to two bricks; and five or six feet above the surface of the ground they may be diminished on each side, to reduce them to the thickness of a brick and a half; which must be continued to the top. The piers in these high walls should also be proportionably stronger than is commonly

allowed to lower walls; for, as being more exposed to strong gales of wind, if they are not well built, they are in danger of being blown down. The piers in these cases should be projected the length of a brick in the backside, and the thickness of a brick in the front, and be built about ten or twelve feet asunder.

There is, however, no necessity for building walls higher than nine or ten feet, unless for pears.

In building of hot-walls, the ordinary height is usually about ten feet, which is sufficient for any of those sorts of fruits which are generally forced; for, by forcing the trees, they are mostly weakened in their growth, so that they do not grow so vigorously as those which are exposed to the open air; and where there is not a quantity of walling planted sufficient to let one part rest every other year, the trees are never very healthy, and last but a few years. In these walls the foundations should be made four bricks and a half thick, in order to support the flues; otherwise, if part of them rest on brick-work, and the other part on the ground, they will settle unequally, and soon be out of order; for, wherever there happen any cracks in the flues, through which the smoke can make its escape, it will prevent their drawing; and if the smoke gets within the glasses, it will greatly injure the fruit, and give it a smoky taste. This thickness of wall need not be continued more than six inches above the ground, where the foundation or bottom of the first flue should be, which will be sufficient to raise it above the damps of the earth: then the wall may be set off four inches on each side, which will reduce it to the thickness of three bricks and a half, so that the back wall may be two bricks thick, which is absolutely necessary to throw the heat out more in front; for, when the back walls are built too thin, the heat escapes through them. The wall in front next to the fruit should be only four inches thick, whereby there will be an allowance of nine inches for the flues, which may be covered with twelve-inch tiles; for, if they have an inch and a half bearing on each side, it will be sufficient. The places in which the fires are made must be contrived on the backside of the walls, which should be in number proportionable to the length of the walls. The length usually allowed for each fire to warm is forty feet, though they do very well for fifty feet: they should be shedded over with brick and tile, to keep out the wind and rain, otherwise the fires will not burn equally; and as it is quite necessary to have the fire-places or ovens below the foundation of the first flues, there must be steps down into the sheds, to come to the mouth of them to supply

the fuel; of course they should not be narrower than eight feet in the clear. Where the length of walling requires two ovens, they may be in the middle, being included in one shed, which will save expense, and allow more room to attend the fires; as in this case the sheds must be at least ten feet long, but not more than six in breadth; the steps down being at one end.

In regard to the lower flue through which the smoke first passes from the fire, it may be two feet and a half deep; of course the back wall should be at least two bricks and a half thick, as high as to the top of this flue; and then it may be set off to two bricks, which must be continued to the top of the wall. The second flue, which should return over the first, may be made two feet, the third a foot and a half, and the fourth one foot deep; which four flues, with their coverings, will rise near eight feet in height, so that there will be about two feet left for fixing of the frames at the top to support the glasses, and for the coping of the wall; these four returns will be sufficient to warm the air in the frames. But in the carrying up these walls, some strong iron hooks should be well fastened at convenient distances projecting about two inches from the wall, to which the trellis must be fastened which is to support the trees. The flues must be well pargeted with loam on their inside, and loam be spread under the tiles which cover them, to the thickness of the hooks, that the flues may be very smooth. At each end of these flues small arches should be turned in the back walls, in such a manner that there may be holes opening to clean the flues of soot whenever there is a necessity for it. With respect to the borders in front of these walls, they should be about four feet wide, which will make a sufficient declivity for the sloping glasses; and on the outside of them should be low walls, rising four or six inches above the level of the borders, upon which the plate of timber must be laid, on which the sloping glasses are to rest. The glasses must be divided into two ranges, being contrived in such a manner, as that the upper row may slide down, and be fastened at suitable distances, but the lower may be either fixed or moveable; and the sloping timbers which support the glass frames, must be fastened at bottom into the ground-plate in the front of the border, and at the top into strong iron cramps, fixed in the upper part of the wall for the purpose. They are best made of fir, which does not twist, as oak and some other wood, where it is laid in such position; and on the top should be fixed, in a close manner, a strong board, under which the upper row of glasses should slide, in order to secure the upper part of the glasses

from being raised by the winds, and keep the wet from the trees. It may project on to the glasses about two inches. The width of the frames may be about three feet, or according to the extent of the wall, the bars being placed lengthways of them. See **HOT-WALL**.

WALL TREES, such fruit-trees as are planted against walls, and have their branches trained to them in a fanned regular manner, from three or four to five or six inches asunder, in order to produce their fruits in a superior degree of perfection. They are trees of the more tender kinds, or such as will not ripen their fruits in this climate, unless trained against walls of a southerly aspect, to have the advantage of the full sun; and several sorts of the hardier kinds, to obtain their fruits in earlier maturity, and of an improved growth and flavour. The trees must be trained to south walls for the principal sorts of the more delicate or tenderer kinds, such as peaches, nectarines, apricots, grapes, figs, &c., to have the benefit of the full sun, as they do not ripen in good perfection without this assistance. Some of the best varieties of the principal sorts of the hardier fruit-trees, as the most esteemed cherries, plums, and pears, should be also trained to these walls to produce early fruit in the greatest perfection; also some trees of the choicer sorts of summer and autumn apples, to have the fruit earlier, and of an improved rich flavour for immediate eating; likewise some of the best red and white currants and gooseberries: and on west and east walls to have trees of most of these sorts, to ripen in good perfection, in succession to those on the south walls, especially cherries, plums, and pears, and occasionally some common peaches, nectarines, and apricots; but vines and figs generally on south walls, especially vines, which require all possible benefit of the full sun to ripen the grapes in proper season, and with a rich flavour: the north walls are eligible for any of the common hardier summer and autumn fruits, as cherries, particularly morellos, plums, and pears, for late ripening, to succeed those of the more sunny exposures, and to continue a longer succession of particular sorts, which ripen for immediate eating from the trees; also white and red currants for successional ripening in the autumn. Trees of this sort may be considered as of two orders; common dwarf wall-trees and half-standard wall-trees. See **STANDARD TREES** and **TRAINED TREES**.

The proper season for planting wall-trees is either in autumn, as in October, November, &c., or in spring, as February and March, or not later than the beginning of April, but before that time, if possible; as late spring-planting,

after the young trees begin to push their shoot-buds, is often attended with bad success.

The soil for wall-trees should be a good dry mellow garden earth, not less than one full spade deep; but if two or more, it will be advantageous: or where a good moderately light loamy soil prevails, it is superior for most sorts of fruit-trees; and when enriched by good garden compost it is still more beneficial.

The most proper aspects for the different kinds are as above; and the methods of planting, training, pruning, and nailing, of the different sorts are explained under their particular culture, in the several heads.

WALL-FLOWER. See CHEIRANTHUS.

WALL-PEPPER. See SEDUM.

WALNUT TREE. See JUGLANS.

WALTHERIA, a genus affording plants of the woody exotic kind.

It belongs to the class and order *Monadelphia Pentandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a perianth (double: outer one-sided, three-leaved, deciduous; cav. inner) one-leaved, half-five-cleft, acute, cup-shaped, permanent: the corolla has five petals, obcordate, spreading, fastened at bottom to the tube of filaments: the stamina have five filaments, united into a tube, free above, spreading, short: anthers ovate: the pistillum is an ovate germ: style filiform, longer than the stamens: stigmas pencilled: the pericarpium is an obovate capsule, one-celled, two-valved: the seed one, obtuse, wider above.

The species cultivated are: 1. *W. Americana*, American Waltheria: 2. *W. Indica*, Indian Waltheria: 3. *W. angustifolia*, Narrow-leaved Waltheria.

The first has a soft, woody stem, about two feet high, sending out two or three side branches: the leaves alternate, of a pale yellowish green colour; soft and hairy: the flowers collected in a close thick spike at the top of the stem, having soft hairy calyxes: the petals connected at their base, small, bright yellow, spreading. It is a native of South America, &c.

The second species rises with a shrubby branching stalk to the height of eight or ten feet, and is covered with soft hairs: the leaves alternate, petioled, four inches long, and two inches broad in the middle, rounded at both ends, of a yellowish green colour, very hairy and soft, having several longitudinal veins: the heads axillary, sessile, composed of clusters of very small yellow flowers, which just peep out of their soft yellow calyxes. It is a native of India.

The third has woody stalks, six or seven feet high, dividing into several branches, which are

less hairy than those of the second sort: the leaves about three inches and a half long, and an inch and half broad, of a yellowish green colour, not so soft as those of the second, having many veins running from the midrib, standing upon very long footstalks: the flowers very small, yellow, collected into round clusters, standing upon very short peduncles, close to the axils. They appear in June, July, and August. It is a native of the East Indies.

Culture.—These plants may be increased by seeds, which must be sown on a hot-bed; and when the plants are fit to plant out, they must be each removed into a separate small pot, and plunged into a fresh hot-bed, being afterwards treated in the same manner as other tender plants of the same nature, being kept in the bark-stove. In the second year they flower and produce seeds, but may be continued three or four years if they be often shifted, and the roots pared to keep them within compass. In the view of keeping the roots out of the tan, they should be drawn up out of it at least once in six weeks, during the summer season, and the plants be shifted out of the pots once in two months: with this management the second and third sorts may be continued several years, but the first seldom endures longer than two.

They have a good effect in stove collections.

WART-WORT. See EUPHORBIA.

WATER, a well known useful article in gardening, for watering numerous sorts of young plants and trees, seed-beds, &c., especially in the drouthy spring and summer seasons, both such as grow in the full ground, and in pots in the open air, as well as those in green-houses, stoves, hot-beds, &c.: and also in ornamental designs, in pleasure grounds, parks, &c., either when formed into regular pieces, circular, oval, or in oblong or serpentine canals, &c., likewise when varied in a somewhat natural expanse in curves and bendings.

In forming designs of this sort, the nature of the supply should be first considered, whether it be by springs in or near the place, by currents or streams passing through, or so nearly adjacent as to admit of being conducted to the place: or by being conducted from some neighbouring river, brook, or lake, &c., by means of pipes or small cuts, or by being collected issuing from higher grounds, and conducted by proper channels. And another circumstance equally necessary is to consider the means by which it may be retained afterwards. In a loose earthy, sandy, or gravelly bottom, it will soon sink away, especially in dry weather, unless there is a constant current or flow of water running in; but in a naturally strong clayey bottom

of proper thickness both at sides and below, it may be retained in some tolerable degree.

In most cases art, however, will be necessary in this business. See *BASONS*, &c.

Where it is easily attainable in any of the above modes, it should not be omitted, in a smaller or larger scale, especially in grounds of any considerable extent; but where intended principally as reservoirs for watering gardens, they may be of much more moderate dimensions than when designed for ornament; and may be formed either in a circular manner, an oblong canal, pond, or cut, &c., where the supply of water can be most conveniently procured.

Ornamental plats or pieces of water in pleasure-grounds are very desirable, as being great additions to the beauty, variety, and embellishment of them, when properly disposed, and contrasted with some nearly-adjoining detached clumps of plantation, and bounded with a proper expanse of grass ground, spreading from the verge considerably outwards.

In general, when any spaces of water, on a larger or smaller scale, are intended, they should be disposed as conspicuously as possible in some principal division; either sometimes at or near the termination of a spacious open lawn, or occasionally in some other similar open space; and sometimes disposed more or less internally in some central or other grand opening; in all of which, an expanse of water has a fine effect.

The particular forms may be adapted to the nature of the situation, and the extent to that for the supply of water that can be had.

Cascades or waterfalls are also occasionally introduced in extensive pleasure-grounds where there is the advantage of a rivulet, by which they may be formed either in one large fall, or in two or three smaller ones in succession, having large rough stones placed below to break the water, and increase the sound of the torrent in its fall and passage over them, in some degree similar to that peculiar to natural cascades. And fountains, spouting water from images, &c. are sometimes introduced in the centre of small or moderate basins, or other reservoirs of water in gardens, or grounds where a supplying head of water is conveniently situated sufficiently high to raise and throw the water from the jet or spout in a continued full stream to a considerable height, which falling in the basin, keeps the water of it in motion, prevents stagnation, and is thereby rendered more proper for keeping and breeding fish of the gold and silver kinds, &c. and the spouting and falling of the water has a refreshing effect in the heat of summer.

In the business of forming the ground for water, the earth must be excavated to a proper

VOL. II.

depth, gradually sloping from the verge to the middle, from three to four or five feet deep; sometimes, however, in low situations, the place is naturally hollowed in some degree, so as not to require a general excavation, or only in particular parts, and some general regulations to the whole, which in extensive designs is a considerable advantage. Where the sides and bottom are of a sandy, gravelly, or stony nature, or abound in loose soil, and there is not a constant supplying stream, they must be well secured by the application of a thick coat of well-wrought clay. And where this claying is necessary, in the preparatory excavation, a proper allowance should be made for the additional coat of clay, to the extent of twelve or fifteen inches in thickness, and of several inches of gravel over it, to preserve the clay from being wasted by the motion of the water, and keep it clear, which would otherwise be muddy. But previous to the claying, the loose and uneven parts in the bottom and sides of the cavity should be well rammed, to make the whole firm, even, and smooth; then beginning in the middle space with the clay, and proceeding gradually outward, being careful that no stones, sticks, or other matter, get mixed with it, to occasion fissures or cracks, by which the water may escape, laying it evenly, a small thickness at a time, and spreading it regularly, treading it well with the naked feet; and if dry weather casting water on it occasionally, ramming it well from time to time with wooden rammers; then gradually applying more clay, in the same manner, to the proper thickness, being careful that every part is so well puddled and rammed, as not to leave the smallest vacancy. Thus continuing the claying in a regular manner each way from bottom to the top of the circumference, smoothing the surface evenly, and in dry weather covering it, as the work proceeds, with mats or straw litter, or with the stratum of pebbly gravel. When the whole is finished, the water should be let in.

When this has been done, the top or verge must be regulated and levelled, forming it evenly from the edge of the water in a gradual regular expansion to some extent outward, without any stiff slope close to the water, distinct from the surrounding superficies; laying the ground with grass turf, especially along the margin, continuing it as far down as the general level of the water. Where the extent is considerable, it may be sown with grass seeds.

WATER CRESS. See *SISYMBRIUM*.

WATER LILY. See *NYMPHÆA*.

WATER MELON. See *CUCURBITA CITRULLUS*.

WIN

WHIN. See ULEX.

WHIN, PETTY. See GENISTA.

WHITE BEAM. See CRATÆGUS.

WHITE LEAF. See CRATÆGUS.

WHITE THORN. See CRATÆGUS.

WIDOW-WAIL. See CNEORUM.

WILD OLIVE. See ELÆAGNUS.

WILLOW. See SALIX.

WILLOW, SWEET. See MYRICA.

WINTERA, a genus containing a plant of the exotic tree kind.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Magnoliacæ*.

The characters are: that the calyx is bell-shaped, tri-lobed, with the lobes roundish and concave: the corolla has five oblong, sessile petals, longer than the calyx, and a conical, pitcher-shaped nectarium: the stamina have no filaments; but twelve or sixteen linear, distant antheræ, affixed to the outside of the nectarium: the pistillum is an oval germ, cylindric style, with three obtuse stigmas: the pericarpium is a roundish, trilocular berry, with two heart-shaped seeds.

WOR

The species is *W. Canella*, Wintera, or Bastard Cinnamon.

It rises with a thick woody stem, branching on every side, almost the whole length, growing near twenty feet in height, having a lightish-coloured aromatic bark: the leaves are oblong, obtuse, light-green: the flowers red, in umbellate clusters, at the ends of the branches, succeeded by roundish berries. It is a native of South America.

Culture.—This may be increased by planting cuttings of the shoots in pots filled with mellow loamy mould, plunging them in the bark-bed of the stove. When the plants have attained a good root, they may be removed into separate pots, replunging them in the bark-bed, giving shade and a little water till fresh rooted; being afterwards managed as other woody stove plants. It must always be kept in the stove.

This plant affords variety in the stove among other aromatics.

WINTER-BERRY. See PRINOS.

WOODBINE. See LONICERA.

WOOD, WAXEN. See GENISTA.

WORMWOOD TREE. See ARTEMISIA.

XER

XERANTHEMUM, a genus containing plants of the herbaceous, flowering, annual and shrubby kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*.

The characters are: that the calyx is a compound flower, having the general calyx composed of many long spear-shaped scales: the corolla is composed of many hermaphrodite florets in the disk, each consisting of one funnel-shaped petal, five-parted at top; and tubular female florets in the radius, more slightly cut at the brim: the stamina five very short filaments, and long cylindric antheræ: the pistillum is a short germen, filiform style, having a bifid stigma in the hermaphrodites; and in the females two reflexed stigmas: there is no pericarpium; each floret succeeded by an oblong, coronated seed, placed on a chaffy receptacle.

The species cultivated are: 1. *X. annuum*, Annual Xeranthemum, or Common Eternal Flower; 2. *X. retortum*, Reflexed leaved Eternal Flower; 3. *X. speciosissimum*, Golden Eternal Flower; 4. *X. Sesamoides*, Silvery Eternal Flower; 5. *X. proliferum*, Proliferous Eternal Flower; 6. *X. vestitum*, Leafy-flowered Eternal

XER

Flower; 7. *X. imbricatum*, Imbricated Eternal Flower.

The first rises with an herbaceous, angular, downy, branching stalk, to the height of two or three feet: the leaves are spear-shaped, spreading, hoary, close-sitting; and all the stalks and branches terminated by large flowers singly, of different colours in the varieties, appearing from July to September, and succeeded by ripe seeds in autumn. It is a native of the Cape.

There are varieties with large white flowers, with purple flowers, with double white flowers, with double purple flowers, and with double violet-coloured flowers.

The second species has under-shrubby trailing stalks, set with recurved, reflexed, hoary-silvery leaves: the flowers come out at the axillas of the branches, having white rays and yellow disks. It is a native of Africa.

The third has an upright shrubby stem, branching three or four feet in height, being set with spear-shaped, trifurcous, sessile leaves; and at the termination of the branches large bright golden-yellow flowers. It is a native of the Cape.

The fourth species has also an upright shrubby

stem, with slender hoary branches, rising three or four feet in height: the leaves small, linear, adpressed, laid close to the branches; and the branches are terminated with large silvery white flowers. This plant is also a native of the Cape.

The fifth has shrubby proliferous stalks: the leaves are granulous-roundish, lightly imbricated: the flowers sitting close to the branches.

The sixth species rises with an upright shrubby stem, branching three or four feet in height: the leaves are linear spear-shaped, mucronated: and the flowers are terminal, leafy, white. It is a native of Africa.

The seventh has the stalks shrubby; and the leaves oval-awl-shaped, smooth, imbricated: the flowers at the end of the branches.

These plants have the name of Eternal Flower, from the circumstance of their continuing long after being plucked.

Culture.—In the first sort and varieties the culture is readily effected by sowing the seeds in pots of light fresh mould in the autumn or spring, or at other seasons for a succession, plunging them in a moderate hot-bed, to bring forward the plants. In the spring they may also be sown in patches where they are to remain, or in beds to be afterwards removed. When the plants have a few inches growth, they should be pricked out in rows a foot apart on beds, or into the borders, clumps, or other places where they are to grow. They should afterwards be kept clean from weeds, and have occasional waterings immediately after pricking out, and afterwards in dry weather.

The other sorts are raised by planting cuttings of the young shoots in the summer in pots filled with light mould, giving them a little water and shade; or, which is better, plunging them into a hot-bed, and covering them with hand-glasses. When they are become firmly established in the autumn, they should be carefully removed into separate pots, being replaced in the hot-bed till re-rooted, after which they should have the management of other shrubby green-house plants.

The first sort produces a fine effect in the borders, clumps, &c. while growing, as well as in pots when the flowers are taken off. And the

other sorts afford variety in green-house collections.

XYLOPIHYLLA, a genus containing plants of the tender exotic kind for the stove.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Euphorbiae*.

The characters are: that the calyx is a six-parted coloured cup: the corolla has no petals; but nectariums composed of six glandules affixed to the germen: the stamina five short filaments and single antheræ: the pistillum is a roundish germ, three short styles, crowned with lacerated stigmas: the pericarpium is a roundish trilobular capsule: the seeds double.

The species cultivated are: 1. *X. longifolia*, Long-leaved Love Flower; 2. *X. latifolia*, Broad-leaved Love Flower; 3. *X. falcata*, Falcated Love Flower.

The first rises with four-angled branches, which are set with long linear leaves. It is a native of America.

The second species also rises with round branches: the leaves are broad spear-shaped. It is a native of the West Indies.

The third has a woody stem and branches: the leaves are linear spear-shaped, shining, placed irregularly: and at the upper part of the branches the flowers are produced upon the edges of the leaves, being very closely placed. It is a native of America.

Culture.—These plants are increased by sowing the seeds in pots in the early spring, and plunging them in a hot-bed: when the plants are come up two or three inches in growth, they should be pricked out in separate pots, replunging them in the hot-bed: they may afterwards be managed as other stove plants of a similar growth.

They are also, some of them, capable of being raised by off-sets, slips, and cuttings, assisted by a hot-bed in the same manner.

They require the constant protection of the stove in winter, but in the hot summer months may be set out in their pots in a sheltered situation, being taken in on the approach of cold nights.

They afford variety, and are curious in stove collections.

YEW TREE. See TAXUS.

YUCCA, a genus containing plants of the succulent, evergreen, shrubby, hardy, and tender kinds.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Lilia*.

The characters are: that there is no calyx: the corolla is monopetalous, bell-shaped, and divided into six large oval segments: the stamina, six very short reflexed filaments, having small antheræ: the pistillum is an oval three-cornered germ, longer than the stamina; no style, but an obtuse three-furrowed stigma: the pericarpium is an oblong, triangular, trifid, trivalved capsule of three cells, containing many seeds lying over one another in a double series.

The species cultivated are: 1. *Y. gloriosa*, Common Adam's Needle; 2. *Y. filamentosa*, Thready Virginian Yucca; 3. *Y. aloifolia*, Aloe-leaved Yucca; 4. *Y. Draconis*, Dragon Tree-leaved Yucca.

The first has an erect, ligneous, thick stem, two or three feet in height, having very long, narrow, stiff, entire leaves, ending in a long, sharp, black spine, garnishing the stem almost to the bottom, and in a large tuft at top: from the centre of the top leaves rises a long branching peduncle, sustaining a panicle of bell-shaped white and purple flowers. It is a native of Canada, flowering in August.

The second species rises with an upright, thick, ligneous stem, two or three feet high, adorned at top with a tuft of very long spear-shaped, stiff, blunt-pointed, sawed, filamentose leaves, emitting long threads from the sides, hanging downward; and from the top of the stem amidst the leaves an erect peduncle or flowerstalk, several feet high, which is set with many large white and purple striped leaves. It is a native of Virginia, flowering in August and September.

The third rises with an erect, thick, fleshy stem, eight or ten feet in height: it is crowned with a large tuft of long, narrow, stiff, crenated, aloe-like leaves ending in sharp spines: from the

centre of the crown of leaves comes out the flowerstalk, branching pyramidally two or three feet in height, having all the branches terminating in a spike of flowers, purple without and white within, appearing in August and September. It is a native of America.

The fourth species has an upright, thick, brown stem, three feet in height, crowned with long, narrow, serrated leaves ending in spines and nodding downward: in the centre of the leaves arises the flowerstalk very branchy, with all the branches terminating in spikes of flesh-coloured flowers, which appear in August and September. It is also a native of America.

Culture.—These plants are all capable of being raised by off-sets or suckers, from the roots and heads of the old plants, as well as by seed.

The off-sets and suckers may be taken off any time in the spring or summer seasons, being laid in some dry place for a few days, till the wounded part caused by the separation from the plant is dried and healed over; when they may be planted out separately in pots of light sandy compost, and be placed in a shady situation till they have taken root in a perfect manner. When assisted by a hot-bed, they often succeed better.

The seed obtained from abroad should be sown in the spring in pots of light earth, plunging them in a hot-bed, in which the plants soon come up; and when they are two or three inches high, they should be pricked out separately in small pots of light sandy mould, re-plunging them in the hot-bed to forward their growth, assisting them with moderate waterings and fresh air daily, and hardening them by degrees to the full air, so as to be set out in June to remain till October, when they should be removed into the green-house for the winter.

Some plants of all the sorts should constantly be preserved in pots.

They are all very ornamental; the two first after they have been hardened, in the dry borders, where the soil is light and where the situation is warm and sheltered; and the others in green-house collections, among other potted plants.

ZANTHOXYLUM, a genus containing plants of the hardy and tender exotic shrubby kinds.

It belongs to the class and order *Diacia Pentandria*.

The characters are: that the male flowers have the calyx a perianthium deeply cut into five oval coloured parts: there is no corolla: the stamina have five awl-shaped erect filaments, with didymous, sulcated, roundish antheræ:—female flower, calyx as the male: there is no corolla: the pistillum, a roundish germen, an awl-shaped style, with an obtuse stigma: the pericarpium, an oblong capsule, formed of two valves and one cell, containing a single smooth roundish seed.

The species cultivated are: 1. *Z. Clava Herculis*, Canada Tooth-ach Tree, or Hercules's Club; 2. *Z. trifoliatum*, Chinese Tooth-ach Tree.

The first grows to the height of twelve feet, with a rough bark armed with short spines: the leaves are winged, of a dark-green colour, growing irregularly on the branches; each consists of four or five pair of spear-shaped folioles, which are terminated by an odd one: the flowers come out from the end of the branches in loose panicles; they are apetalous and have no great appearance, and succeeded by unilocular capsules, containing the seeds. It is a native of North America.

There is a variety; the Ash-leaved Tooth-ach Tree, with oval-oblong folioles, and prickly mid-ribs.

The second species rises with a woody stem, branching several feet in height, being set with trifoliate leaves, composed of three egg-oval folioles. It is a native of China.

Culture.—These plants may be increased by seeds and layers.

The seeds should be sown in the spring, either in an east border, or in pots placed in the morning sun all the summer, being sheltered in a frame in winter; and in the spring following removed to the full air till October, giving proper waterings all the summer; and towards winter be placed again under shelter from frost till March, when the young plants may be potted separately; and thus continued for a year or two, being sheltered in the winter, when they may be transplanted into the shrubbery, where they are to remain.

The layers of the young wood may be laid down in autumn or early spring, and when they

have stricken good root be taken off and managed as the seedlings.

They also succeed by cuttings in spring or summer, planted in pots, assisted by a hot-bed, in which they soon strike, when they should be inured to the full air; and the young plants will be fit for planting out in the autumn, or the spring following.

The first is a very ornamental plant in the borders and other dry parts of shrubberies, and the latter among potted plants in the green house collections.

ZEÄ, a genus containing a plant of the hardy herbaceous annual kind.

It belongs to the class and order *Monœcia Triandria*, and ranks in the natural order of *Gramineæ*.

The characters are: that male and female flowers are separate on the same plant; loosely disposed: the calyx, a bivalve, two-flowered husk: the corolla, two oblong valves, the outward one obtuse and bellied, and the interior bidentated at top, and are inclosed in the calyx, with a very short, diphyllous nectarium: the stamina, three capillary filaments in the males, with bifid prismatic antheræ, opening at top; the female flowers are closely collected in a spike below the males on the same plant: the calyx a single-flowered husk, with two valves; with a corolla, a glumose husk, and four membranous unequal valves: the pistillum, a very small germen, slender pendulous style, and simple stigma: there is no pericarpium: many compressed, roundish seeds, immersed in an oblong, thick five-angled receptacle, forming together a long, thick, close head of corn.

The species cultivated is *Z. Mays*, Maize, or Indian Corn.

It rises with a large, strong, herbaceous stem, ten or twelve feet high, garnished with long, broad, pendulous leaves: male flowers at the upper part of the stalks, in spikes eight or ten inches long; and females arising at the axillas of the leaves below the males, in long, close, thick spikes, covered with thin leaves; and succeeded by numerous seeds placed round the long receptacle in a compact order. Native of America.

There are varieties; with yellowish-white seeds, with deep yellow seeds, and with purple-blue seeds.

Culture.—These plants may be raised by sowing seed in the spring, as March or April, in a dry warm situation, where the plants are intended to remain, in patches, of two or three

seeds or more in each, about an inch and half deep: when the plants are come up, they should be thinned out to one or two of the strongest. But to have the plants more forward, so as to produce ripe seed-spikes more effectually, some should be sown in a hot-bed at the same time, and when the plants are three or four inches high, be forwarded by pricking them out upon another hot-bed, either under a deep frame or an awning of hoop arches to be covered with mats occasionally, allowing them plenty of free air; and when they have sufficient growth, as in May, they may be transplanted, with balls of earth about their roots, into the full ground in the borders or shrubby clumps, in warm sunny situations, being well watered; and when the summer proves warm and dry, they often produce perfect heads, and the seeds ripen in a good manner.

As the plants mostly run up in tall stalks, it is proper to support each with a tall neat stake, especially where much exposed to wind and rain.

These plants in the different varieties have a fine effect in the back parts of borders, clumps, and other places, in warm sheltered situations.

ZINNIA, a genus containing plants of the annual flowering kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*.

The characters are: that the calyx has the general cup oval, cylindric, and imbricated, with many blunt, upright, persistent scales: the corolla compound and radiated, consisting of hermaphrodite florets, placed in the disk, and female ones, which are ligulated, and form the rays: the stamina of the hermaphrodites are five short filaments, with cylindric tubulose antheræ: the pistillum is an oblong aristated germin, with a slender semibifid style, and two erect obtuse stigmas: in the female flowers the germen is oblong and triquetrous, with a capillary style, and two recurved stigmas: the pericarpium has the calyx containing oblong solitary seeds crowned with down, and placed on a paleaceous receptacle.

The species cultivated are: 1. *Z. pauciflora*, Few-flowered Yellow Zinnia; 2. *Z. multiflora*, Many-flowered Red Zinnia.

The first has the root fibrous, from which arises the stalk to about three feet high; it is woody below, and branches upwards, which are placed opposite: these are furnished with oblong leaves of a pleasing green colour: the flowers terminate the ends of the branches on long footstalks; they are of a yellow colour, which decays before the seeds are ripe. It is an annual.

The second species is also annual: the stalk rises erect with upright branches; these are channelled and hairy: the leaves are oval, lanceolate, and placed opposite: the flowers come out at the extreme part of the branches: the florets of the disk are yellow, and those which form the rays are of a dusky red; these continue till the seed is ripe, which is in the autumn.

Culture.—These annual plants are increased from seeds, which should be sown on a slight hot-bed in the early spring, as March, and when the plants are a few inches high, they should be pricked out on another bed previously prepared to receive them, where they should remain till the advance of summer, when they may be taken up and planted out in the borders of the pleasure-ground, where they blow and complete their seeds for the year following.

They have a fine effect in their leaves and flowers in these situations.

ZYGOPHYLLUM, a genus comprising plants of the herbaceous and woody succulent exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Rutææ*.

The characters are: that the calyx consists of five oval, obtuse, concave, erect leaves: the corolla has five obtuse petals emarginated at top, and a ten-leaved closed nectarium, which includes the germen: the stamina, ten awl-shaped filaments, and oblong incumbent antheræ: the pistillum, an oblong germen, awl-shaped style, crowned by a simple stigma: the pericarpium, an oval, pentagonous, quinquevalvulous capsule of five cells, having many roundish seeds.

The species are: 1. *Z. Fabago*, Common Bean Caper; 2. *Z. sessilifolium*, African Bean Caper; 3. *Z. Morgsana*, Purslane-leaved Ethiopian Bean Caper; 4. *Z. spinosum*, Thorny Bean Caper; 5. *Z. album*, White Egyptian Bean Caper.

The first has a thick, fleshy, deeply-striking, perennial root: the stalks upright, round, smooth, jointed, herbaceous, green, three or four feet in height, being set with oval, smooth, fleshy, blueish-green leaves, two or three together on each petiole, and reddish flowers by two or three together at the axillas of the stalks, appearing in July, succeeded by long capsules, containing the seed, ripening in autumn. It is durable in root; but the stalks, being herbaceous, perish every autumn. It is a native of Asia.

The second species rises with an upright woody stem, branching numerous and irregularly, three or four feet in height: the leaves oval spear-shaped, thick, smooth, succulent, sessile, surrounding the branches by fours: the flowers yellow, on long slender footstalks at the

sides of the branches, appearing in succession great part of summer. It is a native of Africa.

There are varieties; with yellow flowers, with sulphur-coloured flowers, with white flowers, with copper-coloured flowers, having mostly a reddish or brown spot near the base of each petal.

The third rises with a shrubby stem, dividing and branching irregularly, three or four feet in height: the leaves oval, thick, obtuse, succulent, surrounding the branches by fours: the flowers are sulphur-coloured, on long footstalks from the sides of the branches, appearing most part of summer. It is a native of Africa.

There is a variety with flame-yellow-coloured flowers.

The fourth species has under-shrubby stalks: the leaves close-sitting, with linear acute folioles. It is a native of Africa.

The fifth has the leaves foot-stalked, and clubbed fleshy lobes.

Culture.—The first sort is raised from seeds, which should be sown in the spring in pots filled with light sandy mould, or on a hot-bed. When the plants have a few inches growth, they should be removed into separate pots plunging them into a hot-bed, admitting air so as gradually to harden them to the open ground. They should be protected for a winter or two, and then be

turned out into borders, or other parts, where the situation is warm and the soil dry and rubbishy, as they are of a succulent nature.

The other sorts are capable of being increased by cuttings and seeds; the cuttings should be planted out in the spring or summer in pots filled with light sandy mould, and plunged in a hot-bed, being occasionally watered, when they quickly emit roots, and shoot at top; and when sown in the summer months, they may be planted in a shady place, or in pots placed in the shade, giving frequent waterings, when they will also take good root. In either method, they should be potted off separately towards autumn, in order to be moved into the green-house or glass-case in the beginning of autumn.

The seed should be sown in the spring in pots of light earth, and be plunged in a hot-bed, where they soon come up; when a little advanced in growth, they should be pricked out in separate small pots, being watered and replunged into the hot-bed till well rooted, when they should be gradually hardened to the full air, and in June set out to remain till the autumn, when they should be placed in the green house, or some other place where they may have protection for the winter.

The first sort affords variety in the borders, as well as among potted plants; and the others in collections of the green-house kind.

The following is a Communication received from Mr. BUONAIUTI, Gardener to the Right Honourable Lord HOLLAND, Holland-House, Kensington, which we introduce in the manner it was sent.

DAHLIA. This genus was established by the late Cavanilles, in honour of Dr. Andrew Dahl, a Swedish botanist, and the friend of Baron Alströmer.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, at least in this cold climate.

The stems die every winter, but the root is perennial and tuberos, not very dissimilar to that of the Artichoke.

Four species have been described.

1. *Pinnata*, pinnated as it is called, and figured by Cavanilles in his *Ik. Pl. v. 1. tab. 80.* It is also figured under this name in the 4th vol. of Andrews's *Bot. Repository.* In the *Annales du Mus. National Hist. Nat. v. 3.* M. Thouin calls this species *Purpurea*, but its colour varies from the common *Pinnata*, being very deep; and Mr. R. A. Salisbury suspects that this *Purpurea* of Thouin is the true *Rosea* of Cavanilles. A

paler coloured variety of the *Pinnata*, the seeds of which were sent to Holland-House with the name of *Rosea* by Cavanilles, has been lately figured by Mr. Hooker in the *Paradisus Londinensis*, and described by the above-mentioned botanist, under the name of *Sambucifolia*: that it is not the true *Rosea* of Cavanilles, *Ik.* is unquestionable; for the leaves were simply pinnate, not bipinnate.

2. *Rosea*, Rose-coloured. It is so called and figured by Cavanilles in his *Icones*; but the plant called *Rosea* by M. Thouin in the *Annales*, is most probably the very variety of the first species figured by the name of *Sambucifolia* in the *Paradisus Londinensis*.

3. *Coccinea*, Scarlet. This is figured in Curtis's publication; but we entertain a doubt if it is the same with Cavanilles's plant, if the colour is well copied. The plant, we understand, is dead.

4. *Crocata*, Saffron-coloured. This plant is

not mentioned in any work previous to the *Paradisus Londinensis*, where it is figured and described by the name of *Bidentifolia*. Though the parcels of seeds which came from Cavanilles himself had the title of *Crocata*, the flowers turned out yellow.

It is not intended here to describe minutely these plants; it is sufficient to say, that they elevate themselves majestically like the Holy-hock, and bear both axillary and terminal showy flowers late in the autumn.

Culture.—The first Dahlias introduced into England were lost by taking too much care of them. As they are natives of the hilly parts of Mexico, they will thrive in the open ground very well, and accustom themselves in a very few generations to ripen seeds here annually. By giving the history of those plants which have grown in the gardens of Holland-House, Kensington, it is only meant to offer hints for their culture, leaving the rest to future experience and observation.

On the 20th of May, 1804, the Right Honourable Lady Holland sent home from Spain a parcel of seeds. Though so late in the season, part of them were sown in pots in a hot-bed, and among these was the *Dahlia Pinnata*, with a wrong name on the parcel. When the plant was about fourteen inches high, it was planted in the open ground and grew luxuriantly, pushing up several stems to the height of seven and eight feet. The *Coccinea* and *Crocata*, the seeds of which also came up, but did not grow so full. In the middle of September the first flowers appeared, by which the plant was known to be the *Pinnata* of Cavanilles, and it was figured by Mr. Andrews the same year. The seeds did not ripen, and the roots were taken up on the approach of a sharp frost, and placed in the green-house in a pot for the winter.

In the spring of 1805 all the parcels of seed sent from abroad were sown, and many Dahlias came up among them, which at the time of flowering showed four distinct species or varieties. It seems that Cavanilles, and the French botanists after him, mean to make as many species as there are different coloured Dahlias; but the learned Mr. Salisbury, one of the Vice Presidents last year of the Linnean Society, considers them all simply as varieties of only two distinct species, and has in the *Paradisus Londinensis* named them, not according to their colour, but after the differences of their leaves, being inclined to believe that they will in time vary like the China Aster and Marygold.

And, in fact, with regard to the *Dahlia Pinnata*, now commonly called *Purpurea*, we have great reason to confirm that botanist's suspicion,

having seen nine different varieties of it, either in the colour or multiplication of the petals. The flower, in its natural state, has only eight *ligulated* petals: a few had twelve. There was also one plant with archdouble flowers, exceedingly pale: another with archdouble flowers, exceeding deep purple, exactly like that figured in the *Annales du Mus.* but the flowers were so complicated together, and the autumn of 1805 so cold, they never expanded. We must observe, that the leaves of this plant were bipinnated, but whether it is a real distinct species is not yet positively ascertained.

The *Dahlia Rosea* was last year (1805) the most handsome, and ripened plenty of seeds. The *Purpurea* ripened fewer and weaker seeds, though they now (10th May, 1806) come up freely; the plants, however, look weak. Of the seeds of *Coccinea* and *Crocata*, no plants have yet appeared, though to the eye they seemed as perfect as those imported from Spain.

All the plants of 1805, except one, were taken up before Christmas, and planted in pots or large pans; but though kept in a very cold green-house, they began to push new shoots in the middle of April, and will be planted in the open ground without the help of any artificial heat. Some rich mould round the roots is the only culture they require. The plant left all the winter out of doors was situated close to a south wall; and though it had no covering of any kind, it is now pushing up new shoots. It is necessary to add, that several plants of Dahlias have been raised by cuttings, which are now in good health, and which will probably flower and produce seeds next autumn.

10th July, 1806. Above a hundred plants of Dahlias are now growing in various parts of the gardens at Holland-House in the highest luxuriance: among them are several of the yellow-flowered *Bidentifolia*, raised from seeds saved there last year, though the autumn proved so unfavourable. One plant of the *Purpurea* of Andrews's Bot. Repository is already showing flowers.

The true *Rosea* of Cavanilles, with doubly pinnated leaves, is also growing most vigorously, and one of its stems has been pinched to produce lateral shoots for cuttings. A plant left in the middle of one of the borders of the French garden at Holland-House by mistake, and exposed to the severity of the winter, without any shelter, is as strong and vigorous as any of the other two-year old plants; so that there is not a doubt that this magnificent genus will soon be a common ornament of the gardens in this island.

In plate 19* is a representation of a plant of the *Dahlia Pinnata* or *Purpurea*.

INDEX

INDEX

TO THE

GENERA OF THE PLANTS.

ABROMA

Abrus
Acanthus
Acer
Achania
Achillea
Achras
Achyranthus
Aconitum
Acorus
Acrostichum
Actæa
Adansonia
Adenanthera
Adiantum
Adonis
Adoxa
Æschynomine
Æsculus
Agapanthus
Agaricus
Agave
Ageratum
Agrimonia
Agrostemma
Ailanthus
Aitonia
Ajuga
Albica
Alcea
Alchemilla
Aletris
Allium
Aloe
Alstromeria
Althæa
Alyssum
Amaranthus
Amaryllis
Ambrosia
Amellus
Amerinum
Amethystea
Anonum
Amorpha
Amygdalus
Amymis
Anacardium
Anagallis
Anagyris
Anastatica
Ancusa

Abroma
 Jamaica Wild Liquorice
 Bear's Breech
 Maple Tree
 Bastard Hibiscus
 Milfoil, Yarrow
 Sapola Tree
 Rough Silician Achyranthus
 Aconite, Monk's Hood
 Sweet Rush
 Acrostichum
 Herb Christopher
 African Calabash Tree
 Bastard Flower-Fence
 Maiden Hair
 Adonis Flower, Pheasant's Eye
 Hollow Root, Tuberous Moschatel
 Bastard Sensitive Plant
 Horse Chestnut Tree
 African Lily
 Common Mushroom
 American Aloe
 Hairy Ageratum
 Agrimony
 Wild Lychnis, Rose Campion
 Ailanthus
 Aitonia
 Bugle
 Bastard Star of Bethlehem
 Hollyhock, Rose Mallow
 Ladies' Mantle
 Guinea Aloe
 Garlick, Onion, Leek, &c.
 Aloe
 Alstromeria
 Marsh Mallow
 Madwort
 Amaranth, or Flower Gentile
 Lily, Daffodil, &c.
 Ambrosia
 Star Flower
 Amerinum
 Amethystea
 Ginger
 Bastard Indigo
 Almond Tree, Peach, &c.
 Sweet-Wood
 Cashew Nut Tree
 Anagallis
 Stinking Bean-Trefoil
 Rose of Jericho
 Bugloss, Garden Alkanet

Andrachne
Andromeda
Andryala
Anemone
Anethum
Angelica
Annona
Anthemis
Anthericum
Antholyza
Anthospermum
Anthyllus
Antirrhinum
Apium
Apocynum
Aquilegia
Arabis
Aralia
Arbutus
Arctotis
Arduina
Arceæ
Argemone
Aristolochia
Arnica
Artemisia
Artocarpus
Arum
Arundo
Asarum
Asclepias
Ascyrum
Aspalathus
Asparagus
Asphodelus
Aster
Astragalus
Athanasia
Atrophaxis
Atriplex
Azalia

Baccharis
Banisteria
Barleria
Begonia
Bellis
Berberis
Beta
Betula
Bignonia
Bixa

Bastard Orphine
 Andromeda
 Andryala
 Anemone, Hepatica, &c.
 Dill, Fennel, &c.
 Angelica
 Custard Apple
 Chamomile
 Spider-wort
 Ethiopian Corn-flag
 Amber Tree
 Anthyllus
 Snap Dragon
 Parsley, Celery
 Dog's Bane
 Columbine
 Alpine Wall-ress
 Berry-bearing Angelica
 Strawberry Tree
 Arctotis
 Cape Buckthorn
 Fausel-nut Palm
 Prickly Poppy
 Birth-wort
 Leopard's Bane
 Mugwort, Southernwood, Taragon, &c.
 Bread-Fruit Tree
 Arum, Cuckow Pint
 Reed, Portugal Reed, &c.
 Asarabacca
 Swallow-wort
 St. Peter's Wort
 African Broom
 Asparagus
 Asphodel Lily, King's Spear
 Aster, Starwort
 Milk Vetch, Goat's Thorn
 Athanasia
 Atrophaxis
 The Orach
 American Honeysuckle

Baccharis, Ploughman's Spikenard
 Banisteria
 Barleria
 Begonia
 Daisy
 Berberry, Piperidge Bush
 Beet
 Birch and Alder
 Trumpet Flower
 Anotta, American Bixa

INDEX TO THE GENERA OF THE PLANTS.

<i>Elitum</i>	Blite, or Strawberry Spinach	<i>Cineraria</i>	Cineraria, Sky Flower
<i>Bocconia</i>	Parrot-Weed, Tree Celandine	<i>Cistus</i>	Cistus, Rock Rose
<i>Bumlar</i>	Silk-Cotton Tree	<i>Cikuracylon</i>	Fiddle Wood
<i>Bontia</i>	Bontia, Barbadoes Wild Olive	<i>Citrus</i>	Citron Tree, Orange Tree, &c.
<i>Borago</i>	Borage	<i>Clematis</i>	Virgin's Bower
<i>Borbonia</i>	Borbonia	<i>Cleome</i>	Cleome
<i>Bosca</i>	Golden-rod Tree	<i>Clethra</i>	Clethra
<i>Brassica</i>	Cabbage, Cauliflower, Brocoli, Turnep	<i>Clifortia</i>	Clifortia
<i>Bromelia</i>	Pine Apple	<i>Clitoria</i>	Clitoria
<i>Browallia</i>	Browallia	<i>Closia</i>	Balsam Tree
<i>Brunia</i>	Brunia	<i>Cluytia</i>	Cluytia
<i>Brunfelsia</i>	Brunfelsia	<i>Cleorom</i>	Widow Wail, Spurge Olive
<i>Bubon</i>	Bubon	<i>Coccoloba</i>	Sea-side Grape
<i>Bucknera</i>	Bucknera	<i>Cochlearia</i>	Horse Radish
<i>Buddlea</i>	Buddlea	<i>Cocos</i>	Cocoa Nut Tree
<i>Bulbocodium</i>	Mountain Saffron	<i>Coffea</i>	Coffee Tree
<i>Ruphthalmum</i>	Ox-eye	<i>Colchicum</i>	Meadow Saffron
<i>Bupleurum</i>	Hare's Ear	<i>Colutea</i>	Bladder Senna
<i>Bulmus</i>	Flowering Rush	<i>Comptonia</i>	Comptonia
<i>Buxus</i>	Box Tree	<i>Conrallaria</i>	Lily of the Valley
		<i>Convolvulus</i>	Convolvulus
<i>Cacalia</i>	Foreign Colt's Foot	<i>Coryza</i>	Flea Bane
<i>Cartus</i>	Meion Thistle, Creeping Cereus, &c.	<i>Capajera</i>	Balsam of Capivi Tree
<i>Casalpinia</i>	Barbadoes Flower Fence	<i>Cordia</i>	Cordia
<i>Calandula</i>	Marigold	<i>Coreopsis</i>	Thick-seeded Sun-Flower
<i>Calla</i>	Æthiopian Arum	<i>Coriandrium</i>	Coriander
<i>Callicarpa</i>	Callicarpa	<i>Coriaria</i>	Myrtle-leaved Sumach
<i>Caltha</i>	Marsh Marigold	<i>Cornus</i>	Dog-Wood
<i>Calycanthus</i>	Carolina Allspice	<i>Cornutia</i>	Cornutia
<i>Camellia</i>	Japan Rose	<i>Coronella</i>	Coronella
<i>Campanula</i>	Bell Flower	<i>Cortusa</i>	Bear's-Ear, Sanicle, or Matthiolum
<i>Canarina</i>	Canary Bell Flower	<i>Corylus</i>	Hazel, or Nut Tree
<i>Canella</i>	White Cinnamon	<i>Corypha</i>	Fan Palm
<i>Canna</i>	Indian Flowering Reed	<i>Cotyledon</i>	Navel-Wort
<i>Capparis</i>	Caper Bush	<i>Crambe</i>	Sea Cabbage
<i>Capsicum</i>	Guinea Pepper	<i>Crassula</i>	Lesser Orpine, or Live Ever
<i>Carica</i>	Papaw Tree	<i>Cratagus</i>	Hawthorn, Wild Service, &c.
<i>Carpinus</i>	Hornbeam	<i>Crataeva</i>	Garlick Pear
<i>Carthamus</i>	Bastard Saffron	<i>Crepis</i>	Bastard Hawk-Weed
<i>Carum</i>	Caraway	<i>Crescentia</i>	Calabash Tree
<i>Caryophyllus</i>	Clove Tree	<i>Crimum</i>	Crimum
<i>Cassia</i>	Wild Senna	<i>Crithmum</i>	Sea or Rock Samphire
<i>Cassine</i>	Hottentot Cherry	<i>Crocus</i>	Crocus
<i>Catananche</i>	Candy Lion's Foot	<i>Crotalaria</i>	Crotalaria
<i>Catesbea</i>	The Lily Thorn	<i>Croton</i>	Tallow Tree
<i>Ceanothus</i>	New Jersey Tea	<i>Cucumis</i>	Cucumber Melon
<i>Cedrela</i>	Bastard Cedar	<i>Cucurbita</i>	Gourd, Pumpkin, &c.
<i>Celastrus</i>	Staff Tree	<i>Cupressus</i>	Cypress Tree
<i>Celosia</i>	Cock's Comb	<i>Cyclamen</i>	Snow-bread
<i>Celsia</i>	Celsia	<i>Cynara</i>	Artichoke, Cartoon
<i>Celtis</i>	Nettle Tree	<i>Cynaglossum</i>	Hound's Tongue
<i>Centaurea</i>	Centaury Blue Bottle, &c.	<i>Cypripedium</i>	Lady's Slipper
<i>Cephalanthus</i>	Button Tree	<i>Cyrtanthus</i>	Cyrtanthus
<i>Cerastium</i>	Mouse-ear Chickweed	<i>Cytisus</i>	Cytisus or Laburnum
<i>Ceratonia</i>	Carob Tree		
<i>Cercis</i>	Judas Tree	<i>Dais</i>	Dais
<i>Cerinthe</i>	Honey Wort	<i>Daphne</i>	Spurge Laurel, Mezereon
<i>Cestrum</i>	Bastard Jasmine	<i>Datura</i>	Thorn Apple
<i>Chamarops</i>	Dwarf Palm	<i>Daucus</i>	Common Carrot
<i>Chciranthus</i>	Wail Flower, Stock, &c.	<i>Delphinium</i>	Dolphin Flower
<i>Chredonium</i>	Horned Poppy	<i>Dentaria</i>	Tooth-Wort
<i>Chelone</i>	Chelone	<i>Dianthus</i>	Sweet William, Pink, &c.
<i>Chenopodium</i>	Goosefoot	<i>Dictamnus</i>	White Dittany
<i>Chiococca</i>	Snowberry Tree	<i>Digitalis</i>	Fox Glove
<i>Chionanthus</i>	Virginian Snowdrop, Fringe Tree	<i>Dionaea</i>	Venus's Fly Trap
<i>Chironia</i>	Chironia	<i>Diosma</i>	Diosma
<i>Chrysanthemum</i>	Chrysanthemum	<i>Diospyros</i>	Indian Date Plum
<i>Chrysobalanus</i>	Cocoi Palm	<i>Dirca</i>	Leather-Wood
<i>Chrysocoma</i>	Goady Locks	<i>Disandria</i>	Disandria
<i>Chrysophyllum</i>	Broad-leaved Star-Apple	<i>Dudartia</i>	Dudartia
<i>Cichorium</i>	Succory, or Endive	<i>Dodecatheon</i>	Virginian Cowslip, or Meadial

INDEX TO THE GENERA OF THE PLANTS.

<i>Dodonea</i>	Dodonea	<i>Helianthus</i>	Annual Sun-Flower
<i>Doronicum</i>	Leopard's Bane	<i>Heliconia</i>	Bastard Plantain
<i>Dracena</i>	Dragon Tree	<i>Helicteres</i>	Screw Tree
<i>Dracopisphalum</i>	Dragon's Head, Balm of Gilead, &c.	<i>Heliotropium</i>	Peruvian Turnsole
<i>Dracoutum</i>	Perforate-leaved Dragon	<i>Helleborus</i>	Winter Hellebore
<i>Ebenus</i>	Ebony	<i>Helonias</i>	Helonias
<i>Echinops</i>	Globe Thistle	<i>Hemerocallis</i>	Day Lily
<i>Ehretia</i>	Ehretia	<i>Hernania</i>	Hernania
<i>Elaeagnus</i>	Wild Olive	<i>Hernandia</i>	Jack-in-a-box Tree
<i>Elephantopus</i>	Elephant's Foot	<i>Hesperis</i>	Night-smelling Rocket
<i>Empetrum</i>	Black-berried Heath	<i>Hibiscus</i>	Hibiscus
<i>Ephedra</i>	Shrubby Horse Tail	<i>Hieracium</i>	Hawkweed
<i>Epicea</i>	Trailing Arbutus	<i>Hippophae</i>	Sea Buckthorn
<i>Eriobium</i>	Willow Herb	<i>Himulus</i>	Hop
<i>Epimedium</i>	Alpine Barrenwort	<i>Hura</i>	Sand-Box Tree
<i>Erica</i>	Heath	<i>Hyoanthus</i>	Hyacinth
<i>Erigeron</i>	Erigeron	<i>Hydrangea</i>	Hydrangea
<i>Erinus</i>	Erinus	<i>Hydrastis</i>	Canadian Yellow-root
<i>Erioccephalus</i>	Erioccephalus	<i>Hymenaea</i>	Locust Tree
<i>Eryngium</i>	Eryngo, Sea Holly	<i>Huacayamus</i>	Common Henbane
<i>Erysimum</i>	Hedge Mustard	<i>Hypericum</i>	St. John's Wort, &c.
<i>Erythrina</i>	Coral Tree	<i>Hysopus</i>	Hyssop
<i>Erythronium</i>	Dog's Tooth Violet	<i>Iberis</i>	Candy Tuft
<i>Eugenia</i>	Eugenia	<i>Ilex</i>	Common Holly
<i>Euonymus</i>	Spindle Tree	<i>Illecebrum</i>	Illecebrum
<i>Eupatorium</i>	Hemp Agrimony	<i>Impatiens</i>	Common Yellow Balsam
<i>Euphorbia</i>	Spurge	<i>Indigofera</i>	Dyer's Indigo
<i>Fagara</i>	Fagara	<i>Inula</i>	Inula
<i>Fagus</i>	Beech Tree	<i>Ipomaea</i>	Ipomaea
<i>Ferraria</i>	Ferraria	<i>Iris</i>	Iris
<i>Ferula</i>	Fennel Giant	<i>Itea</i>	Itea
<i>Ficus</i>	Fig Tree	<i>Iva</i>	False Jesuit's Bark Tree
<i>Fothergilla</i>	Fothergilla	<i>Ixia</i>	Ixia
<i>Fragaria</i>	Strawberry	<i>Ixora</i>	Ixora, or Indian Wild Jasmine
<i>Fraxinus</i>	Ash Tree	<i>Jacquinia</i>	Jacquinia
<i>Fritillaria</i>	Fritillary	<i>Jasminum</i>	Common Jasmine
<i>Fuchsia</i>	Fuchsia	<i>Jatropha</i>	Physic Nut
<i>Fumaria</i>	Fumitory	<i>Juglans</i>	Walnut Tree
<i>Galanthus</i>	Snow Drop	<i>Juniperus</i>	Common Juniper
<i>Garcinia</i>	Garcinia	<i>Justicia</i>	Justicia
<i>Gardenia</i>	Cape Jasmine	<i>Kampferia</i>	Galangale
<i>Genista</i>	Broom	<i>Kalmia</i>	Kalmia
<i>Gentiana</i>	Gentian	<i>Kiggelaria</i>	Kiggelaria
<i>Geranium</i>	Crauc's Bill	<i>Knautia</i>	Knautia
<i>Geum</i>	Herb Bennet	<i>Lachenalia</i>	Lachenalia
<i>Glabolus</i>	Sword Lily	<i>Lactuca</i>	Common Lettuce
<i>Gleditsia</i>	Three-thorned Acacia	<i>Lagerstromia</i>	Lagerstromia
<i>Globularia</i>	Globular Blue Daisy	<i>Lagocchia</i>	Wild Cummin
<i>Gloriosa</i>	Superb Lily	<i>Lantana</i>	Lantana
<i>Gloxinia</i>	Gloxinia	<i>Lathyrus</i>	Everlasting Pea
<i>Glycine</i>	Glycine or Kidney Bean Tree	<i>Lavandula</i>	Common Lavender
<i>Glycyrrhiza</i>	Common Liquorice	<i>Lavatera</i>	Lavatera, Tree Mallow
<i>Gnaphalium</i>	Tree Everlasting	<i>Laurus</i>	Common, Sweet Bay
<i>Gomphrena</i>	Annual Globe Amaranth	<i>Lawsonia</i>	Lawsonia
<i>Gordonia</i>	Loblolly Bay	<i>Ledum</i>	Marsh Ledum, or Wild Rosemary
<i>Gorteria</i>	Gorteria	<i>Lepidium</i>	Common Cress
<i>Gossypium</i>	Cotton Shrub	<i>Leucopium</i>	Great Snow Drop
<i>Grewia</i>	Grewia	<i>Ligusticum</i>	Common Lovage
<i>Guaicum</i>	Lignum Vita	<i>Ligustrum</i>	Common Privet
<i>Gutlandina</i>	Banduc, or Nicker Tree	<i>Lilium</i>	Lily, Common White, &c.
<i>Hemeranthus</i>	Blood Flower	<i>Limodorum</i>	Limodorum
<i>Hematoxyllum</i>	Blood Wood, or Logwood Tree	<i>Linum</i>	Flax
<i>Halesia</i>	Snow-Drop Tree	<i>Liquidambar</i>	Liquidambar
<i>Halleria</i>	African Fly Honeysuckle	<i>Liriodendrum</i>	Tulip Tree
<i>Hamamelis</i>	Witch Hazel	<i>Lobelia</i>	Cardinal Flower
<i>Hedera</i>	Common Ivy	<i>Lonicera</i>	Honeysuckle
<i>Hedysarum</i>	French Honeysuckle	<i>Loranthus</i>	Loranthus

INDEX TO THE GENERA OF THE PLANTS.

<i>Lotus</i>	Bird's Foot Trefoil, Winged Pea	<i>Oryza</i>	Rice
<i>Lunaria</i>	Honesty	<i>Osteospermum</i>	Osteospermum
<i>Lupinus</i>	Lupine	<i>Oxyria</i>	Poet's Cassia
<i>Lychnis</i>	Lychnis, Wild Campion	<i>Othonna</i>	Ragwort
<i>Lycium</i>	Box Thorn	<i>Oxalis</i>	Wood Sorrel
<i>Lysimachia</i>	Louse Strife		
<i>Lythrum</i>	Willow Herb	<i>Pæonia</i>	Peony
		<i>Panax</i>	Panax
<i>Magnolia</i>	Magnolia	<i>Pancratium</i>	Pancratium
<i>Mahernia</i>	Mahernia	<i>Pandanus</i>	Pandanus
<i>Malope</i>	Malope	<i>Papaver</i>	White Poppy
<i>Malyghia</i>	Barbadoes Cherry	<i>Parietaria</i>	Tree Pellitory
<i>Malva</i>	Mallow	<i>Parkinsonia</i>	Parkinsonia
<i>Mammea</i>	Mammea Tree	<i>Parthenium</i>	Parthenium
<i>Mangifera</i>	Mango Tree	<i>Pascerina</i>	Sparrow Wort
<i>Maranta</i>	Indian Arrow Root	<i>Passiflora</i>	Passion Flower
<i>Marrubium</i>	Horehound	<i>Pastinaca</i>	Parsnip
<i>Martynia</i>	Martynia	<i>Pelargonium</i>	Crane's Bill, &c.
<i>Massonia</i>	Massonia	<i>Pentapetes</i>	Pentapetes
<i>Matricaria</i>	Common Feverfew	<i>Pentstemon</i>	Bastard Asarum
<i>Mauritia</i>	Maiden-hair Tree	<i>Periploca</i>	Periploca
<i>Medeola</i>	Medeola	<i>Petiveria</i>	Gumen-Hen Weed
<i>Medicago</i>	Tree Medic	<i>Petrea</i>	Petrea
<i>Melastoma</i>	American Gooseberry	<i>Phaseolus</i>	Kidney Bean
<i>Melia</i>	Bead Tree	<i>Philadelphus</i>	Syringa, Mock Orange
<i>Melianthus</i>	Honey Flower	<i>Phillyrea</i>	Phillyrea
<i>Melissa</i>	Baum	<i>Phlomis</i>	Phlomis
<i>Melittis</i>	Bastard Baum	<i>Phlox</i>	Lychnidea, or Bastard Lychnis
<i>Menispermum</i>	Moon-Seed	<i>Phlox</i>	Date Plum Tree
<i>Mentha</i>	Mint	<i>Phlyca</i>	Phlyca
<i>Mesembryanthemum</i>	Fig Marigold	<i>Phyllanthus</i>	Sea-side Laurel
<i>Mespilus</i>	Medlar	<i>Phyllis</i>	Bastard Hare's Ear
<i>Mesua</i>	Indian Mesua	<i>Physalis</i>	Winter Cherry
<i>Michauxia</i>	Michauxia	<i>Phytolacca</i>	Phytolacca
<i>Michelia</i>	Indian Michelia	<i>Pimpinella</i>	Anise
<i>Mimosa</i>	Mimosa	<i>Pinus</i>	Wild Pine Tree, Fir, &c.
<i>Mimulus</i>	Monkey-Flower	<i>Piper</i>	Black Pepper
<i>Mirabilis</i>	Marvel of Peru	<i>Piscidia</i>	Jamaica Dogwood Tree
<i>Moluccella</i>	Molucca Baum	<i>Pisonia</i>	Prickly Pisonia
<i>Momordica</i>	Male Balsam Apple	<i>Pistacia</i>	Pistacia
<i>Monarda</i>	Monarda, Lion's Tail	<i>Pisum</i>	Common Pea
<i>Monsonia</i>	Monsonia	<i>Platanus</i>	Plane Tree
<i>Moræa</i>	Moræa	<i>Plinea</i>	Plinea, or Myrtle
<i>Morina</i>	Morina	<i>Plumbago</i>	European Leadwort
<i>Morus</i>	Mulberry Tree	<i>Plumeria</i>	Plumeria
<i>Musa</i>	Banana Tree	<i>Polemonium</i>	Polemonium, Greek Valerian
<i>Myrica</i>	Candleberry Myrtle	<i>Polyanthes</i>	Indian Tuberose Hyacinth
<i>Myrsine</i>	African Myrsine	<i>Polygala</i>	Polygala, Milk Wort
<i>Myrtus</i>	Common Myrtle	<i>Polygonum</i>	Knot Grass, Persicaria
		<i>Populus</i>	Poplar Tree
<i>Napæa</i>	Napæa	<i>Portlandia</i>	Portlandia
<i>Narcissus</i>	Common Daffodil, &c.	<i>Portulaca</i>	Purslane
<i>Nepeta</i>	Common Catmint	<i>Portulacaria</i>	African Purslane Tree
<i>Nerium</i>	Common Rosebay	<i>Potentilla</i>	Cinquefoil
<i>Nicotiana</i>	Tobacco	<i>Poterium</i>	Garden Burnet
<i>Nigella</i>	Fennel Flower	<i>Prasium</i>	Hedge Nettle
<i>Nolana</i>	Nolana	<i>Primula</i>	Primrose, Auricula
<i>Nyctanthus</i>	Nyctanthus	<i>Prinos</i>	Winter Berry
<i>Nymphæa</i>	Water Lily	<i>Protea</i>	Protea
<i>Nyssa</i>	Tupelo Tree	<i>Prunus</i>	Plum Tree, Apricot, Cherry Tree, &c.
		<i>Puidium</i>	Guava Tree
<i>Ocimum</i>	Basil, or Basilicum	<i>Psoralea</i>	Psoralea
<i>Oenothera</i>	Tree Primrose	<i>Ptelea</i>	Ptelea, or Shrubby Trefoil
<i>Olea</i>	European Olive	<i>Pulmonaria</i>	Lungwort
<i>Oenonis</i>	Rest Harrow	<i>Punica</i>	Pomegranate Tree
<i>Ophioxylum</i>	Ophioxylum	<i>Pyrus</i>	Pear Tree, Apple Tree, and Quince
<i>Ophrys</i>	Ophrys, or Twayblade		
<i>Orchis</i>	Orchis	<i>Quercus</i>	Oak Tree
<i>Origanum</i>	Origanum, or Marjoram		
<i>Ornithogalum</i>	Star of Bethlehem	<i>Ranunculus</i>	Garden Ranunculus
<i>Orobus</i>	Bitter Vetch	<i>Raphanus</i>	Garden Radish

INDEX TO THE GENERA OF THE PLANTS.

<i>Rauwolfia</i>	Rauwolfia	<i>Staphylea</i>	Bladder Nut
<i>Reseda</i>	Sweet Reseda, or Mignonette	<i>Statice</i>	Thrift, or Sea Gilliflower, Pink
<i>Rhamnus</i>	Buckthorn, Alaternus, &c.	<i>Strelitzia</i>	Strelitzia
<i>Rheum</i>	Rhubarb	<i>Stuartia</i>	Malacodendron
<i>Rhexia</i>	Rhexia, American Soapwort	<i>Syrax</i>	Storax
<i>Rhodola</i>	Yellow Roseroot	<i>Sacetenia</i>	Mahogany Tree
<i>Rhododendrum</i>	Rhododendron, Dwarf Rose Bay	<i>Symphitum</i>	Comfrey
<i>Rhus</i>	Sumach, Poison Tree	<i>Syringa</i>	Lilac
<i>Ribes</i>	Currant Tree, Gooseberry		
<i>Ricinus</i>	Common Palma Christi	<i>Tabernaemontana</i>	Tabernaemontana
<i>Rivinia</i>	Rivinia	<i>Tageles</i>	French and African Marygold
<i>Robinia</i>	False Acacia	<i>Tamarindus</i>	Tamarind Tree
<i>Rondeletia</i>	Rondeletia	<i>Tamarix</i>	Tamarisk
<i>Rosa</i>	Rose Tree and Sweet Brier	<i>Tamus</i>	Black Bryony
<i>Rosmarinus</i>	Rosemary	<i>Tanacetum</i>	Tansy, &c.
<i>Royena</i>	African Bladder Nut	<i>Tarchonanthus</i>	Shrubby African Flea-Bane
<i>Rubia</i>	Dyer's Madder	<i>Torus</i>	Yew Tree
<i>Rubus</i>	Raspberry, Bramble	<i>Telephium</i>	True Opine
<i>Rudbeckia</i>	Rudbeckia	<i>Tetragonia</i>	Tetragonia
<i>Rumex</i>	Sorrel, Dock	<i>Tracrium</i>	Germander
<i>Ruscus</i>	Butcher's Broom	<i>Thalictrum</i>	Meadow Rue
<i>Ruta</i>	Rue	<i>Thea</i>	Tea Tree
		<i>Theobroma</i>	Chocolate Nut Tree
<i>Saccharum</i>	Sugar Cane	<i>Thuja</i>	Arbor Vitæ, &c.
<i>Salix</i>	Willow Tree, Osier	<i>Thymbra</i>	Mountain Hyssop
<i>Salsola</i>	Shrubby Saltwort, Stonecrop Tree	<i>Thymus</i>	Thyme
<i>Salvia</i>	Sage	<i>Tilia</i>	Lime Tree
<i>Sambucus</i>	Elder Tree	<i>Tinus</i>	Tinus, or Tree Volkameria
<i>Sanguinaria</i>	Puccoon, Bloodwort	<i>Tolujera</i>	Balsam of Tolu Tree
<i>Santolina</i>	Lavender Cotton	<i>Tournefortia</i>	Tournefortia
<i>Sapindus</i>	Soap-berry Tree	<i>Trachelium</i>	Throatwort
<i>Saponaria</i>	Soapwort	<i>Tradescantia</i>	Virginian Spiderwort
<i>Sarracenia</i>	Saddle Flower	<i>Tragopogon</i>	Goat's Beard, Salsafy
<i>Saturcia</i>	Savory	<i>Trillium</i>	Trillium
<i>Satyrium</i>	Satyrium, or Lizard-flower	<i>Triumfetta</i>	Triumfetta
<i>Saxifraga</i>	Saxifrage	<i>Tropæolum</i>	Nasturtium, or Indian Cress
<i>Scabiosa</i>	Scabious	<i>Tulipa</i>	Tulip
<i>Scandix</i>	Garden Chervil	<i>Turnera</i>	Turnera
<i>Schinus</i>	Mastic Tree		
<i>Scilla</i>	Squill	<i>Ulex</i>	Furze, Gorse, or Whins
<i>Scorpiurus</i>	Caterpillar Plant	<i>Ulmus</i>	Elm Tree
<i>Scorzonera</i>	Viper's Grass, Spanish Scorzonera	<i>Urena</i>	Indian Mallow
<i>Scrophularia</i>	Figwort		
<i>Scutellaria</i>	Skull-cap	<i>Valeriana</i>	Valerian
<i>Sedum</i>	Stonecrop, Houseleek	<i>Veratrum</i>	Hellebore
<i>Selago</i>	Selago	<i>Verbascum</i>	Mullein
<i>Sempervivum</i>	Houseleek, Tree Sedum	<i>Verbena</i>	Vervain
<i>Senecio</i>	Groundsel	<i>Verbesina</i>	Indian Hemp Agrimony
<i>Serratula</i>	Saw-wort	<i>Veronica</i>	Veronica, Speedwell
<i>Sida</i>	Sida, Indian Mallow	<i>Viburnum</i>	Wayfaring Tree, Guelder Rose, Laurustinus
<i>Sideritis</i>	Iron-wort		
<i>Sideroxylon</i>	Iron-wood	<i>Vicia</i>	Garden Bean
<i>Silene</i>	Catchfly	<i>Vinca</i>	Periwinkle
<i>Silphium</i>	Silphium	<i>Viola</i>	Violet, Heart's Ease
<i>Sinapis</i>	Mustard	<i>Vitis</i>	Chaste Tree
<i>Sisymbrium</i>	Water-cress	<i>Vitis</i>	Vine Tree
<i>Sisyrinchium</i>	Sisyrinchium	<i>Volkameria</i>	Volkameria
<i>Smilax</i>	Skirret		
<i>Smilax</i>	Smilax	<i>Wachendorfia</i>	Wachendorfia
<i>Smyrniolum</i>	Common Alexanders	<i>Waltheria</i>	Waltheria
<i>Solanum</i>	Nightshade, Love Apple, Potatoe	<i>Wintera</i>	Winterana
<i>Soldanella</i>	Soldanella		
<i>Solidago</i>	Golden Rod	<i>Xanthemum</i>	Eternal Flower
<i>Sophora</i>	Sophora	<i>Xylophylla</i>	Love Flower
<i>Sorbus</i>	Mountain Service, Mountain Ash, &c.		
<i>Spartium</i>	Broom	<i>Yucca</i>	Adam's Needle
<i>Spermacoe</i>	Button-weed		
<i>Spinacia</i>	Garden Spinach	<i>Zanthoxylum</i>	Tooth-ach Tree
<i>Spiraea</i>	Spirea	<i>Zea</i>	Maize, or Indian Corn
<i>Sporobolus</i>	Hog Plant	<i>Zinnia</i>	Zinnia
<i>Stapelia</i>	Stapelia	<i>Zygophyllum</i>	Bean Caper

INDEX

TO

ENGLISH NAMES OF THE PLANTS.

A BELE Tree	<i>Populus</i>	Arbutus, Dwarf	<i>Arbutus</i>
Acacia	<i>Mimosa</i>	Arbutus, Trailing	<i>Epigaea</i>
Acacia, False	<i>Robinia</i>	Artichoke	<i>Cynara</i>
Acacia, Scarlet	<i>Robinia</i>	Artichoke, Jerusalem	<i>Helianthus</i>
Acacia, Three-thorned	<i>Gleditsia</i>	Arum, African	<i>Calla</i>
Acajou	<i>Anacardium</i>	Asarabacca	<i>Asarum</i>
Aconite	<i>Aconitum</i>	Ash Tree	<i>Fraxinus</i>
Aconite, Winter	<i>Helleborus</i>	Ash, Mountain	<i>Sorbus</i>
African Marigold	<i>Tagetes</i>	Ash, Poison	<i>Rhus</i>
Agaric	<i>Agaricus</i>	Asparagus	<i>Asparagus</i>
Agrimony	<i>Agrimonia</i>	Aspen Tree	<i>Populus</i>
Agrimony, Hemp	<i>Eupatorium</i>	Asphodel	<i>Asphodelus</i>
Alaternus	<i>Rhamnus</i>	Asphodel, African	<i>Anthericum</i>
Alaternus, Bastard	<i>Phytica</i>	Asphodel, Lily	<i>Crinum</i>
Alder Tree	<i>Betula</i>	Asphodel, Lily	<i>Heimerocallis</i>
Alder, Berry-bearing	<i>Rhamnus</i>	Atamasca, Lily	<i>Amaryllis</i>
Alexanders	<i>Smyrnum</i>	Avens	<i>Cicum</i>
Alkekengi	<i>Physalis</i>	Avogate Pear	<i>Laurus</i>
All-spice	<i>Myrtus</i>	Auricula	<i>Primula</i>
Alligator Pear	<i>Laurus</i>	Azarole	<i>Crategus</i>
Almond Tree	<i>Amygdalus</i>		
Aloe, African	<i>Aloe</i>	Balm	<i>Melissa</i>
Aloe, American	<i>Agave</i>	Balm of Gilead	<i>Dracocephalum</i>
Althaea Frutex	<i>Hibiscus</i>	Balsam, or Balsamine	<i>Impatiens</i>
Alysson	<i>Alyssum</i>	Balsam Apple, Male	<i>Momordica</i>
Amaranth	<i>Amaranthus</i>	Balsam Tree	<i>Clusia</i>
Amaranthus, Cock's-comb	<i>Celasia</i>	Balsam Tree	<i>Pistacia</i>
Amaranthus, Globe	<i>Gomphrena</i>	Balsam of Gilead Tree	<i>Amyris</i>
Amber Tree	<i>Anthospermum</i>	Balsam of Capivi Tree	<i>Copaifera</i>
Amelanchier	<i>Mespilus</i>	Balsam of Mecca Tree	<i>Amyris</i>
Amellus	<i>Aster</i>	Balsamine, Female	<i>Impatiens</i>
Ananas	<i>Bromelia</i>	Bamboo Cane	<i>Arundo</i>
Andrachne	<i>Arbutus</i>	Banana Tree	<i>Musa</i>
Andromeda	<i>Andromeda</i>	Bane Berries	<i>Actea</i>
Anemone	<i>Anemone</i>	Barba Jovis	<i>Anthyllis</i>
Angelica	<i>Angelica</i>	Bark, False Jesuit's	<i>Ioa</i>
Angelica, Berry-bearing	<i>Aralia</i>	Barren Wort	<i>Epimedium</i>
Angelica Tree	<i>Aralia</i>	Base Trefoil	<i>Cytisus</i>
Anotta	<i>Bixa</i>	Bachelor's Button	<i>Lychnis</i>
Apple Tree	<i>Pyrus</i>	Bay Tree	<i>Laurus</i>
Apple, Custard	<i>Annona</i>	Bay, Loblolly	<i>Gordonia</i>
Apple, Love	<i>Solanum</i>	Bay, Rose	<i>Verum</i>
Apple, Mad	<i>Solanum</i>	Bay, Dwarf Rose	<i>Rhododendrum</i>
Apple, Male Balsam	<i>Momordica</i>	Bay, Plum	<i>Psidium</i>
Apple, Pine	<i>Bromelia</i>	Bead Tree	<i>Melia</i>
Apple, Soap	<i>Sapindus</i>	Bean, Common	<i>Vicia</i>
Apple, Star	<i>Chrysophyllum</i>	Bean, Kidney	<i>Phaseolus</i>
Apple, Sweet	<i>Annona</i>	Bean Tree, Kidney	<i>Glycine</i>
Apple, Thora	<i>Datura</i>	Bean Trefoil, Stinking	<i>Anagyris</i>
Apricot Tree	<i>Prunus</i>	Bearberries	<i>Arbutus</i>
Arbutus	<i>Arbutus</i>	Bearbind	<i>Convolvulus</i>

INDEX TO ENGLISH NAMES OF THE PLANTS.

Bear's Breech	<i>Acanthus</i>	Button Weed	<i>Spermacoce</i>
Bear's Ear	<i>Primula</i>	Cabbage	<i>Brassica</i>
Bear's Ear, Sarcile	<i>Cortusa</i>	Cabbage, Sea	<i>Crambe</i>
Bear's Foot	<i>Helleborus</i>	Cabbage Tree	<i>Areca</i>
Beard, Old-man's	<i>Clematis</i>	Cabbage Tree	<i>Cacalia</i>
Beard, Jupiter's	<i>Anthyllis</i>	Cabbage, Turnip	<i>Brassica</i>
Bee Flower	<i>Ophrys</i>	Calabash	<i>Cucurbita</i>
Bee Larkspur	<i>Delphinium</i>	Calabash Tree	<i>Crescentia</i>
Beech Tree	<i>Fagus</i>	Calamint	<i>Melissa</i>
Beet	<i>Beta</i>	Calamint, Water	<i>Mentha</i>
Bell Flower	<i>Campanula</i>	Calves' Snout	<i>Antirrhinum</i>
Bell Flower, Canary	<i>Canarina</i>	Campeachy Wood	<i>Hemutorylum</i>
Bells, Canterbury	<i>Campanula</i>	Camphor Tree	<i>Laurus</i>
Bell, Hare	<i>Hyacinthus</i>	Campion, Rose	<i>Agrostemma</i>
Bell-Pepper	<i>Capicum</i>	Campion	<i>Lychnis</i>
Belladonna Lily	<i>Amaryllis</i>	Campion, Viscous	<i>Silene</i>
Belvidere	<i>Chenopodium</i>	Canary Bell-Flower	<i>Canarina</i>
Benjamin Tree	<i>Laurus</i>	Candleberry Myrtle	<i>Myrica</i>
Bennet, Herb	<i>Geum</i>	Candy Lion's-Foot	<i>Catananche</i>
Berberry	<i>Berberis</i>	Candy-Tuft	<i>Iberis</i>
Bind-weed	<i>Convolvulus</i>	Candy-Tuft Tree	<i>Iberis</i>
Bind-weed, Rough	<i>Smilax</i>	Cane Reed	<i>Arundo</i>
Bind-weed, Black	<i>Tamus</i>	Cane, Sugar	<i>Saccharum</i>
Birch Tree	<i>Betula</i>	Canterbury Bells	<i>Campanula</i>
Bird Cherry	<i>Prunus</i>	Caper Bush	<i>Capparis</i>
Bird Pepper	<i>Capicum</i>	Caraway	<i>Carum</i>
Bird's Eye	<i>Adonis</i>	Caragana	<i>Robinia</i>
Bird's-foot Trefoil	<i>Lotus</i>	Cardinal Flower	<i>Lobelia</i>
Bird's Nest	<i>Ophrys</i>	Cardoon	<i>Cynara</i>
Bird's Nest, Purple	<i>Orchis</i>	Carnation	<i>Dianthus</i>
Bird's Service	<i>Sorbus</i>	Caruation Tree	<i>Cacalia</i>
Birthwort	<i>Aristolochia</i>	Carob Tree	<i>Cerutonia</i>
Bitter Vetch	<i>Orobus</i>	Carrot	<i>Daucus</i>
Bitter Wort	<i>Gentiana</i>	Carui	<i>Carum</i>
Bladder Nut	<i>Staphylea</i>	Cashew Nut	<i>Anacardium</i>
Bladder Sena	<i>Colutea</i>	Cassava	<i>Jatropha</i>
Bladder Sena, Jointed-podded	<i>Coronilla</i>	Cassia, Poet's	<i>Oxyris</i>
Blite	<i>Blitum</i>	Cassidony	<i>Gnaphalium</i>
Blood Flower	<i>Hemantus</i>	Catalpa	<i>Bignonia</i>
Blood Wood	<i>Hematoxylum</i>	Catchfly	<i>Lychnis</i>
Blood Wort	<i>Rumex</i>	Catchfly, Lobel's	<i>Silene</i>
Bloody Dock	<i>Rumex</i>	Catchfly, German	<i>Lychnis</i>
Blue Bottle	<i>Centaurea</i>	Caterpillar Plant	<i>Scorpiurus</i>
Bonduc Tree	<i>Guilandina</i>	Caterpillar Trefoil	<i>Medicago</i>
Borecole	<i>Brassica</i>	Cat-Mint	<i>Nepeta</i>
Borage	<i>Borago</i>	Cauliflower	<i>Brassica</i>
Bottle Flower	<i>Centaurea</i>	Cedar, Barbadoes	<i>Cedrela</i>
Box Tree	<i>Burns</i>	Cedar, Bermudas	<i>Juniperus</i>
Box Tree, African	<i>Myrsine</i>	Cedar, Carolina	<i>Juniperus</i>
Box Thorn	<i>Lycium</i>	Cedar, Lebanon	<i>Pinus Cedrus</i>
Box Thorn, Ethiopian	<i>Celastrus</i>	Cedar, Lycian	<i>Juniperus</i>
Bramble	<i>Rubus</i>	Cedar, Phœnician	<i>Juniperus</i>
Brank, Ursine	<i>Acanthus</i>	Cedar, Virginian	<i>Juniperus</i>
Bread-Fruit Tree	<i>Artocarpus</i>	Cedar, White	<i>Cupressus</i>
Break-Stone	<i>Saxifraga</i>	Celandine	<i>Cheridonium</i>
Brocoli	<i>Brassica</i>	Celandine Tree	<i>Boconia</i>
Broom	<i>Spartium</i>	Celeriac	<i>Apium</i>
Broom, African	<i>Aspalathus</i>	Celery	<i>Apium</i>
Broom, Dyer's	<i>Gouista</i>	Centaury	<i>Centaurea</i>
Broom, Spanish	<i>Spartium</i>	Cereus	<i>Cactus</i>
Broom, Butcher's	<i>Ruscus</i>	Chanomile	<i>Anthemis</i>
Bryony, Black	<i>Tamus</i>	Chardon (Cardoon)	<i>Cynara</i>
Buckthorn	<i>Rhamnus</i>	Chaste Tree	<i>Viter</i>
Buckthorn, Sea	<i>Hippophae</i>	Cherry Tree	<i>Prunus</i>
Bugle	<i>Ajuga</i>	Cherry, Barbadoes	<i>Mulpighia</i>
Bugloss	<i>Achusa</i>	Cherry, Bird	<i>Prunus</i>
Bullace Tree	<i>Prunus</i>	Cherry, Cornelian	<i>Cornus</i>
Burnet, Garden	<i>Poterium</i>	Cherry, Dwarf	<i>Lonicera</i>
Burning Thorny Plant	<i>Euphorbia</i>	Cherry, Double-blossom	<i>Prunus</i>
Butcher's Broom	<i>Ruscus</i>	Cherry, Hottentot	<i>Cassia</i>
Button Tree	<i>Cephalanthus</i>		

INDEX TO ENGLISH NAMES OF THE PLANTS.

Cherry, Laurel	<i>Prunus</i>	Cowslip	<i>Primula</i>
Cherry, Winter	<i>Physalis</i>	Cowslip, Virginian	<i>Dodecatheon</i>
Cherry, Winter	<i>Solanum</i>	Crab Tree	<i>Pyrus</i>
Cherry, Plum	<i>Prunus</i>	Crab, Siberian	<i>Pyrus</i>
Chervil, Garden	<i>Scandix</i>	Crane's Bill	<i>Geranium</i>
Chervil, Great Perennial	<i>Scandix</i>	Crane's Bill, Shrubby African	<i>Pelargonium</i>
Chesnut Tree	<i>Fagus</i>	Creeper, Virginian	<i>Hedera</i>
Chesnut, Horse	<i>Esculus</i>	Cress, Garden	<i>Lepidium</i>
China-Aster	<i>Aster</i>	Cress, Indian	<i>Tropaeolum</i>
China-Root	<i>Smilax</i>	Cress, Water	<i>Sisymbrium</i>
China Pink	<i>Dianthus</i>	Crocus, Spring	<i>Crocus</i>
China Rose	<i>Hibiscus</i>	Crocus, Autumn	<i>Crocus</i>
Chinquapin	<i>Fagus</i>	Crocus, Saffron	<i>Crocus</i>
Chocolate Nut Tree	<i>Theobroma</i>	Crow Berries	<i>Empetrum</i>
Christmas Rose	<i>Helleborus</i>	Crowfoot	<i>Ranunculus</i>
Christopher Herb	<i>Actæa</i>	Crown, Imperial	<i>Fritillaria</i>
Christ's Thorn	<i>Rhamnus</i>	Cuckow-Pint	<i>Arum</i>
Chrysanthemum	<i>Chrysanthemum</i>	Cucumber	<i>Cucumis</i>
Chrysanthemum, Bastard	<i>Silphium</i>	Cucumber, Spirting	<i>Momordica</i>
Chrysanthemum, Hard-seeded	<i>Osteospermum</i>	Cudweed	<i>Gnaphalium</i>
Cibaules	<i>Allium</i>	Currant Tree	<i>Ribes</i>
Cicely, Sweet	<i>Scandix</i>	Cushion, Lady's	<i>Saxifraga</i>
Cinnamon Tree	<i>Laurus</i>	Custard Apple	<i>Annona</i>
Cinquefoil	<i>Potentilla</i>	Cypress Tree	<i>Cupressus</i>
Cinquefoil, Shrub	<i>Potentilla</i>	Cypress, Summer	<i>Chenopodium</i>
Cistus, Rock Rose	<i>Cistus</i>		
Cistus, Marsh	<i>Ledum</i>	Daffodil	<i>Narcissus</i>
Cistus, Lesser Marsh	<i>Andromeda</i>	Daffodil, Lily	<i>Anaryllis</i>
Citron Tree	<i>Citrus</i>	Daffodil, Lily	<i>Pancreatium</i>
Citrus	<i>Cucurbita</i>	Daffodil, Sea	<i>Pancreatium</i>
Cives	<i>Allium</i>	Dahoon Holly	<i>Ilex</i>
Climber	<i>Climates</i>	Daisy	<i>Bellis</i>
Climber	<i>Smilax</i>	Daisy, Blue	<i>Globularia</i>
Cloud Berry	<i>Rubus</i>	Daisy, Ox-eye	<i>Chrysanthemum</i>
Clove Gilliflower	<i>Dianthus</i>	Daisy, Michaelmas	<i>Aster</i>
Clove Tree	<i>Caryophyllus</i>	Dame's Violet	<i>Hesperis</i>
Cob Nut	<i>Corylus</i>	Damson Tree, Common	<i>Prunus</i>
Cock's-Comb	<i>Celosia</i>	Damson Tree	<i>Chrysophyllum</i>
Cock's-Spur Thorn	<i>Cratægus</i>	Date Tree	<i>Phoenix</i>
Cocoa-Nut Tree	<i>Cocos</i>	Date Plum, Indian	<i>Diospyros</i>
Cocoa Plum	<i>Chrysobalanus</i>	Day Lily	<i>Hemerocallis</i>
Collin Tree	<i>Pyrus</i>	Devil-in-a-Bush	<i>Nigella</i>
Collee Tree	<i>Coffea</i>	Devil's Bit	<i>Scabiosa</i>
Colchicum, or Meadow Saffron	<i>Colchicum</i>	Dewberry Bush	<i>Rubus</i>
Cole Seed	<i>Brassica</i>	Dill	<i>Anethum</i>
Colewort	<i>Brassica</i>	Distaff Thistle	<i>Carthamus</i>
Colewort, Sea	<i>Cranbe</i>	Dittany	<i>Origanum</i>
Cott's-Foot, Alpine	<i>Cacalia</i>	Dock, Bloody	<i>Rumex</i>
Columbine	<i>Aquilegia</i>	Dog's Bane	<i>Asclepias</i>
Columbine, Feathered	<i>Thalictrum</i>	Dog's Bane	<i>Apocynum</i>
Colutea, Jointed-podded	<i>Coronilla</i>	Dogberry	<i>Cornus</i>
Comfrey	<i>Symphytum</i>	Dog's Stones	<i>Orchis</i>
Conval Lily	<i>Convallaria</i>	Dog's Tooth Violet	<i>Erythronium</i>
Convolvulus	<i>Convolvulus</i>	Dog Rose	<i>Rosa</i>
Convolvulus, Scarlet	<i>Ipomæa</i>	Dog Wood	<i>Cornus</i>
Coral Tree	<i>Erythrina</i>	Dog Wood, Jamaica	<i>Erythrina</i>
Coriander	<i>Coriandrum</i>	Dragons	<i>Arum</i>
Cork Tree	<i>Quercus</i>	Dragons	<i>Dracontium</i>
Corn, Indian	<i>Zea</i>	Dragon's Head	<i>Draconcephalum</i>
Corn Flag	<i>Gladiolus</i>	Dragon Tree	<i>Dracæna</i>
Corn Marigold	<i>Chrysanthemum</i>	Dragon, Snap	<i>Antirrhinum</i>
Corn Rose	<i>Papaver</i>	Dropwort	<i>Spiræa</i>
Corn Salad Herb	<i>Valeriana</i>	Dyer's Broom	<i>Genista</i>
Corn Bottle	<i>Centaurea</i>	Dyer's Weed	<i>Genista</i>
Cornel Tree	<i>Cornus</i>	Dyer's Weed	<i>Reseda</i>
Cornelian Cherry	<i>Cornus</i>		
Costmary	<i>Tanacetum</i>	Ebony	<i>Ebenus</i>
Cotton	<i>Gossypium</i>	Egg Plant	<i>Solanum</i>
Cotton, Lavender	<i>Santolina</i>	Eglantine	<i>Rosa</i>
Cotton Tree, Silk	<i>Bombac</i>	Elder Tree	<i>Sambucus</i>
Courbaril	<i>Hymenæa</i>	Elder, Dwarf	<i>Sambucus</i>

INDEX TO ENGLISH NAMES OF THE PLANTS.

Elemi Tree, Gum
Elemi, Gum
Elephant's Foot
Elm Tree
Endive
Eryngo
Eschalot
Eternal Flower
Eternal Flower
Eternal Flower
Evergreen Oak
Evergreen Thorn
Everlasting
Everlasting Flower
Everlasting Pea
Euonymus
Euonymus, Bastard
Euonymus, Climbing

Fair-Maid-of-Kent
Fan Palm
Fausel Nut
Feather, Prince's
Feathered Columbine
Felwort
Fennel
Fennel Flower
Fennel, Giant
Fennel, Sea
Feverfew
Ficoides
Fiddle Wood
Fig Tree
Fig, Indian
Fig, Cochineal
Fig Marigold
Figwort
Filbert Tree
Filipendula
Fingrigo
Finocchio
Fir Tree
Flag, or Flag Flower
Flag, Common
Flag, Sweet-scented
Flax
Flax, Toad
Fleabane
Fleabane, Shrubby African
Flos Adonis
Flower, Gentle
Flower of an Hour
Flower de Luce
Flower, Bastard
Fly Honeysuckle
Fly Honeysuckle, African
Fly Trap, Venus's
Fool's Stones
Four o'clock Flower
Fox Glove
Fox Glove, False
Frankincense Tree
Frankincense, Jews
Fraxinella
French or Kidney Bean
French Honeysuckle
French Marigold
French Willow
Friar's Cowl
Fringe Tree
Fritillary

Pistacia
Amyris
Elephantopus
Ulmus
Cichorium
Eryngium
Allium
Xeranthemum
Gnaphalium
Gomphrena
Quercus
Mespilus
Gnaphalium
Gomphrena
Lathyrus
Euonymus
Celastrus
Celastrus

Ranunculus
Chamaerops
Areca
Amaranthus
Thalictrum
Gentiana
Anethum
Nigella
Ferula
Crithmum
Matricaria
Mesembryanthemum
Citharorylon
Ficus
Cactus
Cactus
Mesembryanthemum
Scrophularia
Corylus
Spiraea
Pisonia
Anethum
Pinus
Iris
Iris
Acorus
Linum
Antirrhinum
Conyza
Turchanthus
Adonis
Amaranthus
Hibiscus
Iris
Adenantha
Lonicera
Halleria
Dionaea
Orchis
Mirabilis
Digitalis
Mimulus
Pinus
Styrax
Dictamnus
Phaseolus
Hedysurum
Tugetes
Epilobium
Arum
Chionanthus
Fritillaria

Fritillary, Crassa Major
Fritillary, Crassa Minor
Fumitory
Furze
Gale, or Sweet Willow
Galangale
Galbanum
Garlick
Garlick Pear
Gelder Rose
Gentian
Gentianella
Genseng
Gentle Flower
Germander Tree
Germander, Water
Gilead, Balm of
Gilliflower
Gilliflower, Clove
Gilliflower, Queen's
Gilliflower, Stock
Ginger
Ginkgo
Gladiol
Gladiol, Water
Gladwin, Stinking
Glastonbury Thora
Glass Wort
Globe Amaranthus
Globe Daisy
Globe Ranunculus
Globe Thistle
Goat's Thorn
Golden Mouse-ear
Golden Rod
Golden Rod Tree
Goldy Locks
Goldy Locks
Good Henry
Gooseberry Tree
Gooseberry, American
Gooseberry of the Americans
Gooseberry, Barbadoes
Gorse
Gourd
Gourd, Ethiopian Sour
Gourd Tree, Indian
Grain, Scarlet
Grains of Paradise
Grape Tree
Grape, Hyacinth
Greek Valerian
Groundsel Tree
Guava
Guava, French
Guelder Rose
Guelder Rose, Currant-leaved
Guelder Rose, Virginian
Guernsey Lily
Gum Anise
Gum Elemi
Gum Elemi Tree
Gum, Sweet
Gum Tragacanth
Gum Arabic
Gum Galbanum
Hard-bean Tree
Hare-bell
Hare's Ear
Hare's Ear, Bastard

Stapelia
Stapelia
Fumaria
Ulex
Myrica
Muranta
Bubon
Allium
Crataeva
Viburnum
Gentiana
Gentiana
Panax
Amaranthus
Teucrium
Teucrium
Dracacephalum
Dianthus
Dianthus
Hesperis
Choiranthus
Anomum
Mauritia
Gladiolus
Butomus
Iris
Crataegus
Salsola
Gomphrena
Globularia
Trochilus
Echinops
Astragalus
Hieracium
Solidago
Rosa
Chrysocoma
Gnaphalium
Chenopodium
Ribes
Melastoma
Cactus
Cactus
Ulex
Cucurbita
Adansonia
Crescentia
Quercus
Anomum
Vitis
Hyacinthus
Potemonium
Baccharis
Puidium
Cassia
Viburnum
Spiraea
Spiraea
Amaryllis
Hymenaea
Amyris
Pistacia
Liquidambar
Astragalus
Mimosa
Bubon
Carpinus
Hyacinthus
Bupleurum
Phyllis

INDEX TO ENGLISH NAMES OF THE PLANTS

Hartwort, Shrubby Ethiopian	<i>Bupleurum</i>	Hyacinth	<i>Hyacinthus</i>
Hawk Weed	<i>Hieracium</i>	Hyacinth, African Blue	<i>Criminum</i>
Hawk Weed, Bastard	<i>Crepis</i>	Hyacinth, Lily	<i>Scilla</i>
Hawthorn	<i>Crataegus</i>	Hyacinth, Peruvian	<i>Scilla</i>
Hawthorn, Black American	<i>Viburnum</i>	Hyacinth, Starry	<i>Scilla</i>
Hay, Burgundy	<i>Medicago</i>	Hypericum, Frax	<i>Spirea</i>
Hazel-nut Tree	<i>Corylus</i>	Hyssop	<i>Hyssopus</i>
Hazel, Witch	<i>Hamamelis</i>		
Heart's Ease	<i>Viola</i>	Ibiscus	<i>Hibiscus</i>
Heath	<i>Erica</i>	Icece	<i>Chrysobalanus</i>
Heath, Mountain	<i>Saxifraga</i>	Immortal Flower	<i>Gnaphalium</i>
Heath, African	<i>Phyllis</i>	Indian Arrow Root	<i>Moranta</i>
Heath, Berry-bearing	<i>Empetrum</i>	Indian Corn	<i>Zea</i>
Heath, Black-berried	<i>Empetrum</i>	Indian Cress	<i>Tropaeolum</i>
Heath Pen	<i>Orobanch</i>	Indian Fig	<i>Cactus</i>
Hedge-hog Trefoil	<i>Medicago</i>	Indian Gad Tree	<i>Ficus</i>
Hedge-hog Thistle	<i>Cactus</i>	Indian Mallow	<i>Sida</i>
Hedge-hog Holly	<i>Ilex</i>	Indian Oak	<i>Tectona</i>
Hedge-nettle, Shrubby	<i>Prunum</i>	Indian Reed	<i>Canna</i>
Heliotrope	<i>Heliotropium</i>	Indian Shot	<i>Canna</i>
Hellebore	<i>Helleborus</i>	Indigo	<i>Indigofera</i>
Helmet Flower	<i>Aconitum</i>	Indigo, Bastard	<i>Amorpha</i>
Hemp Agrimony	<i>Eupatorium</i>	Iris	<i>Iris</i>
Hen-weed, Guinea	<i>Petiveria</i>	Iris, Bulbous	<i>Iris</i>
Hep Tree	<i>Rosa</i>	Iris, Persian Bulbous	<i>Iris</i>
Hepatica	<i>Anemone</i>	Iris Uvaria	<i>Alstris</i>
Herb Bennet	<i>Geum</i>	Iron Wood	<i>Sideroxylum</i>
Herb Christopher	<i>Actea</i>	Iron Wort	<i>Sideris</i>
Herb of Grace	<i>Ruta</i>	Ivy	<i>Hedera</i>
Herb Mastick	<i>Satureia</i>	Ivy, American	<i>Kalmia</i>
Herb Twopenny	<i>Lythamchia</i>		
Herb, Willow	<i>Epilobium</i>	Jaca Tree	<i>Artocarpus</i>
Herb, Willow	<i>Lythrum</i>	Jacinth	<i>Hyacinthus</i>
Herb, Willow	<i>Lythamchia</i>	Jack-in-a-box	<i>Hernandia</i>
Hermodyctyle	<i>Iris</i>	Jacob's Ladder	<i>Polemonium</i>
Hicory Nut Tree	<i>Juglans</i>	Jacobson Lily	<i>Amoryllis</i>
Hind Berry	<i>Rubus</i>	Jalap	<i>Mirabilis</i>
Hollow Root	<i>Adoxa</i>	Jalap	<i>Convolvulus</i>
Holly	<i>Ilex</i>	Jasmine	<i>Jasminum</i>
Holly, Knee	<i>Ruscus</i>	Jasmine, Arabian	<i>Jasminum</i>
Holly, Sea	<i>Bryngium</i>	Jasmine, Cape	<i>Gardenia</i>
Hollyhock	<i>Alcea</i>	Jasmine, Bastard	<i>Cestrum</i>
Holm Oak	<i>Quercus</i>	Jasmine, Scarlet	<i>Bignonia</i>
Holm, Sea	<i>Eryngium</i>	Jasmine, Red	<i>Plumaria</i>
Honesty	<i>Lunaria</i>	Jasmine, Persian	<i>Springa</i>
Honey Flower	<i>Melianthus</i>	Jericho, Rose of	<i>Anastatica</i>
Honey Locust	<i>Gleditsia</i>	Jersey Tea, New	<i>Ceanothus</i>
Honeysuckle	<i>Lonicera</i>	Jerusalem Artichoke	<i>Helianthus</i>
Honeysuckle, African Fly	<i>Hatteria</i>	Jerusalem, Oak of	<i>Chenopodium</i>
Honeysuckle, American Upright	<i>Azalea</i>	Jerusalem Sage	<i>Phlomis</i>
Honeysuckle, French	<i>Hedysarum</i>	Jesuit's Bark Tree, True	<i>Cinchona</i>
Honeywort	<i>Cerintho</i>	Jesuit's Bark Tree, False	<i>Ina</i>
Hooded Willow Herb	<i>Scutellaria</i>	Jew's Frankincense	<i>Styrax</i>
Hop	<i>Humulus</i>	Johnsonia	<i>Callicarpa</i>
Hop Horn-beam	<i>Carpinus</i>	Jonquil	<i>Narcissus</i>
Horn-beam	<i>Carpinus</i>	Judas Tree	<i>Cercis</i>
Horn-beech Tree	<i>Carpinus</i>	Jujube Tree	<i>Rhamnus</i>
Horned Poppy	<i>Celidonium</i>	July Flower, Clove	<i>Dianthus</i>
Horns	<i>Medicago</i>	July Flower, Queen's	<i>Heperis</i>
Horse Beech	<i>Carpinus</i>	July Flower, Stock	<i>Cheiranthus</i>
Horse Chesnut	<i>Esculus</i>	Juniper Tree	<i>Juniperus</i>
Horse Radish	<i>Cochlearia</i>	Jupiter's Beard	<i>Anthyllis</i>
Horse Tail	<i>Equisetum</i>	Jupiter's Beard, American	<i>Amorpha</i>
Horse Tail, Shrubby	<i>Ephedra</i>		
Horse Tongue	<i>Ruscus</i>	Kadanaku	<i>Aloe</i>
Hottentot Cherry	<i>Cassine</i>	Kale	<i>Brassica</i>
Hound's Tongue	<i>Cynoglossum</i>	Kale, Sea	<i>Crambe</i>
Houseleek	<i>Sempervivum</i>	Kalmia	<i>Kalmia</i>
Houseleek, Lesser	<i>Sedum</i>	Kermes Oak	<i>Quercus</i>
Humble Plant	<i>Mimosa</i>	Ketmia, Bladder	<i>Hibiscus</i>
Hummingbird Tree	<i>Chelone</i>	Kidney Bean	<i>Phaseolus</i>

INDEX TO ENGLISH NAMES OF THE PLANTS.

Kidney Bean Tree	<i>Glycine</i>	Limon	<i>Citrus</i>
Kidney Vetch	<i>Anthyllis</i>	Lion's Foot	<i>Catananche</i>
King's Spear	<i>Asphodelus</i>	Lion's Tail	<i>Phlomis</i>
Knap-weed	<i>Centaurea</i>	Liquorice	<i>Glycyrrhiza</i>
Knee Holly	<i>Ruscus</i>	Liquorice	<i>Astragalus</i>
Knee Holm	<i>Ruscus</i>	Liquorice Vetch, Knob-rooted	<i>Glycyne</i>
Knot Grass	<i>Polygonum</i>	Live-ever	<i>Sedum</i>
		Liverwort	<i>Anemone</i>
Labrador Tea	<i>Ledum</i>	Lobel's Catchfly	<i>Silene</i>
Laburnum	<i>Cytisus</i>	Loblolly Bay	<i>Gordonia</i>
Lac, or Gum Lac	<i>Croton</i>	Locker Gowhans	<i>Trochilus</i>
Lace Bark	<i>Daphne</i>	Locust Tree	<i>Ceratonia</i>
Ladanium	<i>Cistus</i>	Locust Tree	<i>Hymenaea</i>
Ladder, Jacob's	<i>Polemonium</i>	Locust Tree	<i>Robinia</i>
Lady's Bower	<i>Clematis</i>	Locust Tree, Honey	<i>Glutinsia</i>
Lady's Cushion	<i>Saxifraga</i>	Logwood	<i>Hemotorylum</i>
Lady's Finger	<i>Anthyllis</i>	London Pride	<i>Saxifraga</i>
Lady's Mantle	<i>Alchemilla</i>	Looking-glass Plant	<i>Heritiera</i>
Lady's Slipper	<i>Cypripedium</i>	Looking-glass, Venus's	<i>Campanula</i>
Lady's Tresses	<i>Ophrys</i>	Loose Strife	<i>Anagallis</i>
Lamb's Lettuce	<i>Valeriana</i>	Loose Strife	<i>Lythrum</i>
Larch Tree	<i>Pinus</i>	Lords and Ladies	<i>Arum</i>
Larkspur	<i>Delphinium</i>	Lote Tree	<i>Celtis</i>
Lavender	<i>Origanum</i>	Lovage	<i>Ligusticum</i>
Lavender Cotton	<i>Santolina</i>	Love Apple	<i>Solanum</i>
Lavender, Sea	<i>Statice</i>	Love lies Bleeding	<i>Amaranthus</i>
Laurel	<i>Prunus</i>	Lungwort	<i>Pulmonaria</i>
Laurel, Alexandrian	<i>Ruscus</i>	Lupine	<i>Lupinus</i>
Laurel, Dwarf American	<i>Kalmia</i>	Lychnidea	<i>Phlox</i>
Laurel, Sea-side	<i>Phyllanthus</i>	Lychnis, Scarlet	<i>Lychnis</i>
Laurel, Spurge	<i>Daphne</i>	Lychnis, Dwarf	<i>Silene</i>
Laureola	<i>Cestrum</i>		
Laurel-leaved Tulip Tree	<i>Magnolia</i>	Macaw Tree	<i>Cocos</i>
Lauro-cerasus	<i>Prunus</i>	Macedonian Parsley	<i>Bubon</i>
Laurustinus	<i>Viburnum</i>	Mad Apple	<i>Solanum</i>
Leadwort	<i>Plumbago</i>	Madder	<i>Rubia</i>
Leather Wood	<i>Dirca</i>	Madwort	<i>Alysum</i>
Ledon	<i>Cistus</i>	Mahaleb	<i>Prunus</i>
Leek	<i>Allium</i>	Mahogany Tree	<i>Saccharum</i>
Lemon Tree	<i>Citrus</i>	Maiden-hair Tree	<i>Salisburia</i>
Lentisc	<i>Pistacia</i>	Malabar Nut	<i>Justicia</i>
Leopard's Bane	<i>Doronicum</i>	Male Balsam Apple	<i>Momordica</i>
Leopard's Bane, Mountain	<i>Arnica</i>	Mallow	<i>Malva</i>
Lettuce	<i>Lactuca</i>	Mallow, Indian	<i>Sida</i>
Lettuce, Lamb's	<i>Veronica</i>	Mallow, Rose	<i>Alcea</i>
Life, Tree of	<i>Thuja</i>	Mallow Tree	<i>Lavatera</i>
Life, Wood of	<i>Guaiacum</i>	Mallow, Venice	<i>Hibiscus</i>
Lignum Vitæ	<i>Guaiacum</i>	Mammee-sapota	<i>Achras</i>
Lilac	<i>Syringa</i>	Mammee Tree	<i>Mommes</i>
Lily	<i>Lilium</i>	Mandrake	<i>Atropa</i>
Lily, African Blue	<i>Agapanthus</i>	Mango	<i>Mangifera</i>
Lily, African Scarlet	<i>Amaryllis</i>	Mango Tree	<i>Mangifera</i>
Lily, Asphodel	<i>Crinum</i>	Manihot	<i>Jatropha</i>
Lily, Atamasco	<i>Amaryllis</i>	Mangrove Grape Tree	<i>Coccoloba</i>
Lily, Belladonna	<i>Amaryllis</i>	Mauoa Ash	<i>Fraxinus</i>
Lily, Ceylon	<i>Amaryllis</i>	Maple Tree	<i>Acer</i>
Lily, Daffodil	<i>Pancratium</i>	Marigold	<i>Calendula</i>
Lily, Daffodil	<i>Amaryllis</i>	Marigold, African	<i>Tagetes</i>
Lily, Day	<i>Hemerocallis</i>	Marigold, Corn	<i>Chrysanthemum</i>
Lily, Hyacinth	<i>Scilla</i>	Marigold, Fig	<i>Mesembryanthemum</i>
Lily, Japan	<i>Amaryllis</i>	Marigold, French	<i>Tagetes</i>
Lily, Martagon	<i>Lilium</i>	Marjoram, Common Sweet	<i>Origanum</i>
Lily, May	<i>Convolvulus</i>	Marjoram, Pot	<i>Origanum</i>
Lily, Mexican	<i>Amaryllis</i>	Marjoram, Wild	<i>Origanum</i>
Lily, Persian	<i>Fritillaria</i>	Marjoram, Winter	<i>Origanum</i>
Lily, Pyramidal	<i>Lilium</i>	Marsh Elder	<i>Viburnum</i>
Lily, Superb	<i>Gloriosa</i>	Marsh Mallow	<i>Althæa</i>
Lily, Water	<i>Nymphaea</i>	Marsh Marigold	<i>Caltha</i>
Lily of the Valley	<i>Convolvulus</i>	Martagon Lily	<i>Lilium</i>
Lily Thorn	<i>Catesbaea</i>	Marum	<i>Satureia</i>
Lune Tree	<i>Citrus</i>	Marum, Syrian or Cretan	<i>Origanum</i>

INDEX TO ENGLISH NAMES OF THE PLANTS.

Marvel of Peru	<i>Mirabilis</i>	Nep	<i>Nepeta</i>
Marygold	<i>Calendula</i>	Nettle, Snowy	<i>Urtica</i>
Mastic Tree	<i>Pistacia</i>	Nettle, Herap Tartarian	<i>Urtica</i>
Mastic Tree, Indian	<i>Schinus</i>	Nettle, Canada	<i>Urtica</i>
Mastic Herb	<i>Satureia</i>	Nettle Tree	<i>Celtis</i>
Mastic Thyme	<i>Thymus</i>	New Jersey Tea	<i>Ceanothus</i>
Maudlin	<i>Achilles</i>	Nickar Tree	<i>Guilandina</i>
Maw Seed	<i>Papaver</i>	Nightshade	<i>Solanum</i>
May Bush	<i>Crataegus</i>	Nightshade, American	<i>Phytolacca</i>
May Lily	<i>Convallaria</i>	Nightshade, Deadly	<i>Atropa</i>
Meadow Rue	<i>Thalictrum</i>	Nightshade, Malabar	<i>Bacella</i>
Meadow Saffron	<i>Colchicum</i>	Nolana	<i>Nolana</i>
Meadow Sweet	<i>Spiraea</i>	Noli Me Tangere	<i>Impatiens</i>
Meadows, Queen of the	<i>Spiraea</i>	None so Pretty	<i>Saxifraga</i>
Mealy Tree	<i>Viburnum</i>	Nose Bleed	<i>Achilleas</i>
Media	<i>Dodecatheon</i>	Nut Tree	<i>Corylus</i>
Medlar	<i>Mespilus</i>	Nut, Bladder	<i>Staphylea</i>
Medusa's Head	<i>Euphorbia</i>	Nut, Cashew	<i>Anacardium</i>
Melancholy Tree	<i>Nyctanthes</i>	Nut, Chocolate	<i>Theobroma</i>
Melon	<i>Cucumis</i>	Nut, Cob	<i>Corylus</i>
Melon, Water	<i>Cucurbita</i>	Nut, Cocoa	<i>Cocos</i>
Meion Thistle	<i>Cactus</i>	Nut, Fausel	<i>Areca</i>
Melopepo	<i>Cucurbita</i>	Nut, Hazel	<i>Corylus</i>
Mezereon	<i>Daphne</i>	Nut, Malabar	<i>Justicia</i>
Mignonette	<i>Reseda</i>	Nut, Oil	<i>Ricinus</i>
Milfoil	<i>Achillea</i>	Nut, Physic	<i>Jatropha</i>
Milk Vetch	<i>Astragalus</i>	Nut, Pistacia	<i>Pistacia</i>
Milkwort	<i>Polygala</i>	Nut, Wall	<i>Juglans</i>
Mint	<i>Mentha</i>	Oak	<i>Quercus</i>
Mint, Cat	<i>Nepeta</i>	Oak, Evergreen	<i>Quercus</i>
Mint, Pepper	<i>Mentha</i>	Oak, Jerusalem	<i>Chenopodium</i>
Mock Orange	<i>Philadelphus</i>	Oak, Poison	<i>Rhus</i>
Mock Privet	<i>Phillyrea</i>	Oil Nut	<i>Ricinus</i>
Moldavian Balm	<i>Dracocephalum</i>	Old Man's Beard	<i>Clematis</i>
Moly	<i>Allium</i>	Oleander	<i>Nerium</i>
Monkey Flower	<i>Mimulus</i>	Oleaster	<i>Eleagnus</i>
Monkey's Beard	<i>Adansonia</i>	Olive	<i>Olea</i>
Monk's Hood	<i>Aconitum</i>	Olive, Spurge	<i>Daphne</i>
Monk's Rhubarb	<i>Rumex</i>	Olive, Wild	<i>Eleagnus</i>
Moon Seed	<i>Menispermum</i>	Olive, Wild, of Barbadoes	<i>Bontia</i>
Moon Trefoil	<i>Medicago</i>	Onion	<i>Allium</i>
Moon Wort	<i>Lunaria</i>	Onion, Sea	<i>Scilla</i>
Morocco Reed	<i>Adonis</i>	Onion Tree	<i>Allium</i>
Moschatel, Tuberos	<i>Adora</i>	Orach	<i>Atriplex</i>
Mother of Thyme	<i>Thymus</i>	Orach, Berry-bearing	<i>Blitum</i>
Mountain Ash	<i>Sorbus</i>	Orach, Wild	<i>Chenopodium</i>
Mouse Ear	<i>Hieracium</i>	Orange Tree	<i>Citrus</i>
Mugwort	<i>Artemisia</i>	Orange, Mock	<i>Philadelphus</i>
Mulberry Tree	<i>Morus</i>	Origan	<i>Origanum</i>
Mulberry Blite	<i>Blitum</i>	Orpine	<i>Sedum</i>
Mullein	<i>Verbascum</i>	Orpine, Lesser	<i>Crassula</i>
Mule Pink	<i>Dianthus</i>	Orpine Tree	<i>Telephium</i>
Mushroom	<i>Agaricus</i>	Oser	<i>Salix</i>
Mustard	<i>Sinapis</i>	Oswego Tea	<i>Monarda</i>
Myrrh, or Sweet Fern	<i>Scandix</i>	Ox-eye	<i>Bupthalmum</i>
Myrtle	<i>Myrtus</i>	Ox-eye Daisy	<i>Chrysanthemum</i>
Myrtle, Candleberry	<i>Myrica</i>	Ox-slip	<i>Primula</i>
Myrtle-leaved Sumach	<i>Coriaria</i>	Oxyacantha	<i>Berberis</i>
Myrto-cistus	<i>Hypericum</i>	Oxycedrus	<i>Juniperus</i>
Myrtle, Dutch	<i>Myrica</i>		
Napellus	<i>Aconitum</i>	Peony	<i>Paeonia</i>
Napo-Brassica	<i>Brassica</i>	Painted Lady	<i>Dianthus</i>
Napus	<i>Brassica</i>	Painted Lady Pea	<i>Lathyrus</i>
Narcissa-Leucoium	<i>Leucoium</i>	Palm Tree	<i>Chamerops</i>
Narcissus, Common	<i>Narcissus</i>	Palm Tree, Dwarf	<i>Chamerops</i>
Narcissus, Autumnal	<i>Anaryllis</i>	Palm, Cocoa Nut	<i>Cocos</i>
Nasturtium	<i>Tropaeolum</i>	Palm, Fausel Nut	<i>Areca</i>
Navelwort, Venus's	<i>Cotyledon and Cynoglossum</i>	Palm, Mountain Fan	<i>Corypha</i>
Navev	<i>Brassica</i>	Palma Christi	<i>Ricinus</i>
Nectarine	<i>Amygdalus</i>	Palmetto	<i>Chamerops</i>

INDEX TO ENGLISH NAMES OF THE PLANTS.

Pansies, or Pansy
 Papaw Tree
 Papaw Tree, North American
 Paradise, Tree of
 Park Leaves
 Parsley
 Parsley, Macedonian
 Parsley, Stone
 Parsnep
 Pasque Flower
 Passion Flower
 Patience
 Paul's Betony
 Pea
 Pea, Crown
 Pea, Everlasting
 Pea, Heart
 Pea, Heath
 Pea, Painted Lady
 Pea, Pigeon
 Pea, Scarlet
 Pea, Sweet
 Pea, Tangier
 Pea, Winged
 Pea, Wood
 Peach Tree
 Peach, Wolf's
 Pear Tree
 Pear, Avocado
 Pear, Prickly
 Pear, Garlic
 Peerless Primrose
 Pellitory, Bastard
 Pellitory of Spain
 Penguin
 Penny Royal
 Penstemon
 Peony
 Pepper
 Pepper, Boll
 Pepper, Bird
 Pepper, Grape
 Pepper, Guinea
 Pepper, Jamaica
 Peppermint
 Pepper, Wall
 Pepper Wort
 Periwinkle
 Perola
 Persea
 Persian Lily
 Persica
 Persicaria
 Persimon Plum
 Peruvian Mastic Tree
 Petola
 Petty Whin
 Pheasant's Eye
 Pheasant's Eye
 Phillyrea, Cape
 Phillyrea, Common
 Phillyrea, False
 Phu
 Physic Nut
 Pigeon Pea
 Pimento (Allspice)
 Pimpernel
 Pinaster
 Pinca
 Pine Apple
 Pine, Screw

Viola
Carica
Annona
Musa
Hypericum
Apium
Bubon
Bubon
Pastinaca
Anemone
Puniflora
Rumex
Veronica
Pisum
Pisum
Lathyrus
Cardiispermum
Orobis
Lathyrus
Cytisus
Lathyrus
Lathyrus
Lathyrus
Lotus
Orobis
Amygdalus
Solanum
Pyrus
Laurus
Cactus
Cratæva
Narcissus
Achillea
Anthemis
Bromelia
Mentha Pulegium
Chelone
Peonia
Piper
Capicum
Capicum
Vitis
Capicum
Myrtus
Mentha
Sedum
Lepidium
Vinca
Momordica
Laurus
Fritillaria
Amygdalus
Polygonum
Diospyros
Schinus
Momordica
Genista
Adonis
Dianthus
Cassia
Phillyrea
Rhamnus
Valeriana
Jatropha
Cytisus
Myrtus
Anagallis
Pinus
Pinus
Bromelia
Pandanus

Pine Tree
 Pinguin
 Pink
 Pink, Indian
 Pink, Mule
 Pink, Sea
 Pin Pillow
 Pipe
 Pipe Tree, Pudding
 Piper
 Piper, Jamaica
 Piperidge Tree
 Pippin
 Piquettes
 Pishamin Plum
 Pistachia Nut
 Pitch Tree
 Plane Tree
 Plane Tree, False
 Plantain Tree
 Plant, Burning Thorny
 Plant, Egg
 Plant, Humble
 Plant, Ice
 Plant, Sensitive
 Plant, Bastard Sensitive
 Plant Mealy Tree
 Plowman's Spikenard
 Plowman's Spikenard
 Plum
 Plum, American Black
 Plum, Bay
 Plum, Brazilian
 Plum, Indian Date
 Plum, Pishamin or Persimon
 Poison Ash
 Poison Nut
 Poison Oak
 Poison Tree
 Polyanthus Narcissus
 Polyanthus
 Poly, Mountain
 Pomegranate
 Pompon
 Pomum
 Poplar Tree
 Poppy
 Poppy, Horned
 Poppy, Prickly
 Porrum
 Potatoes
 Potatoes, Canada
 Potatoes, Spanish
 Prickly Pear
 Prick-wood
 Primrose
 Primrose, Nightly, or Tree
 Primrose, Peerless
 Prince's Feather
 Prince's Wood
 Privet
 Privet, Evergreen
 Privet, Mock
 Pseudo Acacia
 Pseudo Acorus
 Pseudo Aspidocela
 Pseudo Capsicum
 Pseudo Digitalis
 Puccoon
 Pudding Grass
 Pudding-pipe Tree

Pinus
Bromelia
Dianthus
Dianthus
Dianthus
Statice
Cactus
Syringa
Cassia
Capicum
Myrtus Pimenta
Berberis
Pyrus
Dianthus
Diospyros
Pistachia
Pinus
Platanus
Acer
Heliconia
Euphorbia
Solanum
Mimosa
Mezembryanthemum
Mimosa
Echynomene
Viburnum
Baccharis
Conyza
Prunus
Chrysobalanus
Paidium
Spondias
Diospyros
Diospyros
Rhus
Strychnos
Rhus
Rhus
Narcissus
Primula
Teucrium
Punica
Cucurbita
Pyrus
Populus
Papaver
Chelidonium
Argemone
Allium
Solanum
Helianthus
Cercotululus
Cactus
Euonymus
Primula
Oenothera
Narcissus
Amaranthus
Cordia and Hamelia
Ligustrum
Ligustrum
Phillyrea
Robinia
Iris
Authericum
Solanum
Dracocephalum
Sanguinaria
Meutha Pulegium
Cassia

INDEX TO ENGLISH NAMES OF THE PLANTS.

Pulsatilla, or Pasque Flower	<i>Anemone</i>	Rose Bay, Mountain	<i>Rhododendron</i>
Pumpkin, or Pumpkin	<i>Cucurbita</i>	Rose Bay, Willow Herb	<i>Epithimum</i>
Purging Nut	<i>Jatropha</i>	Rose Campion	<i>Agrostemma</i>
Purple Apple	<i>Annona</i>	Rose, China	<i>Hibiscus</i>
Purslane	<i>Portulaca</i>	Rose, Christmas	<i>Hedisteria</i>
Purslane, Sea	<i>Atriplex</i>	Rose, Corn	<i>Papaver</i>
Purslane Tree	<i>Portulacaria</i>	Rose, Guelder	<i>Viburnum</i>
Pyracantha	<i>Mespilus</i>	Rose, Japan	<i>Camellia</i>
		Rose Mallow	<i>Alcea</i>
Quanoelit	<i>Ipomoea</i>	Rosemary	<i>Rosmarinus</i>
Queen of the Meadows	<i>Spiraea</i>	Rosemary, Wild	<i>Ledum</i>
Queen's Balm	<i>Dracoccephalum</i>	Rose of Jericho	<i>Anastatica</i>
Queen's Gilliflowers	<i>Hesperis</i>	Rose, Rock	<i>Cistus</i>
Queen's Marguerite	<i>Aster</i>	Rose Root	<i>Rhodiola</i>
Queen's Violet	<i>Hesperis</i>	Rue	<i>Ruta</i>
Queen-stock Gilliflower	<i>Cheiranthus</i>	Rue, Meadow	<i>Thalictrum</i>
Quick	<i>Crataegus</i>	Rush, Flowering	<i>Batium</i>
Quicken Tree	<i>Sorbus</i>	Rush, Sweet	<i>Acorus</i>
Quick-beam Tree	<i>Sorbus</i>	Raychiana	<i>Drucoccephalum</i>
Quince, Bastard	<i>Mespilus</i>		
Quince Tree	<i>Pyrus Cydonia</i>	Sabina	<i>Juniperus</i>
		Safflower	<i>Carthamus</i>
Radish	<i>Raphanus</i>	Saffron	<i>Crocus</i>
Radish, Black Spanish	<i>Raphanus</i>	Saffron, Meadow	<i>Colchicum</i>
Radish, Horse	<i>Cochlearia</i>	Sage	<i>Salvia</i>
Radish, Turnep	<i>Raphanus</i>	Sage, Indian Wild	<i>Lantana</i>
Ragged Robin	<i>Lychnis</i>	Sage of Jerusalem	<i>Phlomis</i>
Ragwort	<i>Senecio</i>	Sage Tree	<i>Phlomis</i>
Ragwort, Sea	<i>Cineraria</i>	Sage, Wood	<i>Teucrium</i>
Ragwort, African	<i>Othonna</i>	Saint Andrew's Cross	<i>Ascyrum</i>
Ranuncions	<i>Campanula</i>	Saint Barnaby's Thistle	<i>Centorea</i>
Ranuncions	<i>Allium</i>	Saint Bruno's Lily	<i>Anthericum</i>
Randia	<i>Gardenia</i>	Saint-foin	<i>Hedysarum</i>
Ranunculus, Common	<i>Ranunculus</i>	Saint John's Bread	<i>Cerastium</i>
Ranunculus, Globe	<i>Trollius</i>	Saint John's Wort	<i>Hypericum</i>
Rope	<i>Brassica</i>	Saint Peter's Wort	<i>Ascyrum</i>
Raspberry	<i>Rubus</i>	Saint Peter's Wort, Shrubby	<i>Lonicera</i>
Rattle, Red	<i>Pedicularis</i>	Sallad, Corn	<i>Valeriana</i>
Rattlesnake Root	<i>Polygala</i>	Sallow	<i>Salix</i>
Rattle, Yellow	<i>Rhinanthus</i>	Sambac	<i>Jasminum</i>
Red Cedar	<i>Juniperus</i>	Samphire	<i>Critimum</i>
Reed, Bamboo	<i>Arundo</i>	Sand Box Tree	<i>Hura</i>
Reed, Common	<i>Arundo</i>	Sancile, Bear's Ear	<i>Cortusa</i>
Reed, Spanish or Portugal	<i>Arundo</i>	Sapota, Mammee	<i>Achras</i>
Reed, Indian Flowering	<i>Canna</i>	Sapota Tree	<i>Achras</i>
Rest Harrow	<i>Ononis</i>	Sarsaparilla	<i>Smilax</i>
Rhodia	<i>Rhodiola</i>	Sassafras	<i>Laurus</i>
Rhubarb	<i>Rheum</i>	Satin Flower	<i>Lunaria</i>
Rhubarb, Monk's	<i>Rumex</i>	Satin, White	<i>Lunaria</i>
Rhus Cobbe	<i>Schmadelia</i>	Savin	<i>Juniperus</i>
Roan Tree	<i>Sorbus</i>	Savory	<i>Satureia</i>
Robert, Herb	<i>Geranium</i>	Savoy, Cabbage	<i>Brassica</i>
Robinson Crusoe's Boat	<i>Cactus</i>	Savoy, Spiderwort	<i>Anthericum</i>
Rocamboic	<i>Allium</i>	Saw Wort	<i>Serratula</i>
Rock Rose	<i>Cistus</i>	Saxifrage	<i>Saxifraga</i>
Rocket	<i>Brassica</i>	Saxifrage, Golden	<i>Chrysosplenium</i>
Rocket, Dame's Violet, or Gilliflower	<i>Hesperis</i>	Scabious	<i>Scabiosa</i>
Rocket, Bastard	<i>Reseda</i>	Scallion	<i>Allium</i>
Rocket, Night-smelling	<i>Hesperis</i>	Scarlet Bean	<i>Phaseolus</i>
Rod, Aaron's	<i>Solidago</i>	Scarlet Cardinal Flower	<i>Loelia</i>
Rod, Golden	<i>Solidago</i>	Scarlet Convolvulus	<i>Ipomoea</i>
Rod Tree, Golden	<i>Bonea</i>	Scarlet Horse Chestnut	<i>Paria</i>
Root, China	<i>Smilax</i>	Scarlet Jasmine	<i>Bignonia</i>
Root, False China	<i>Senecio</i>	Scarlet Lupin	<i>Lathyrus</i>
Root, Hollow	<i>Adoxa</i>	Scarlet Lychnis	<i>Lychnis</i>
Root, Rose	<i>Rhodiola</i>	Scarlet Oak	<i>Quercus</i>
Root, Rattle-snake	<i>Polygala</i>	Scorpion Senna	<i>Coronilla</i>
Root, Snake	<i>Aristolochia</i>	Scotch Fir	<i>Pinus</i>
Root, Sweet	<i>Rosa</i>	Scotch Kale	<i>Brassica</i>
Rose Bay	<i>Nerium</i>	Screw Pine	<i>Pandanus</i>
Rose Bay, Dwarf	<i>Rhododendron</i>	Screw Tree	<i>Helicteres</i>

INDEX TO ENGLISH NAMES OF THE PLANTS.

Scul Cap	<i>Scutellaria</i>	Sope Berry	<i>Sapindus</i>
Scurvy Grass	<i>Cucularia</i>	Sope-wort	<i>Saponaria</i>
Sea Buckthorn	<i>Hippophae</i>	Sorb Tree	<i>Sorbus</i>
Sea Cabbage	<i>Crambe</i>	Sorb Tree, Wild	<i>Sorbus</i>
Sea Daffodil	<i>Pancreatum</i>	Sorrel	<i>Rumex</i>
Sea Grape	<i>Coccoloba</i>	Sorrel Tree	<i>Andromeda & Rumex</i>
Sea Holly	<i>Eryngium</i>	Sorrel, Wood	<i>Oxalis</i>
Sea Laurel	<i>Phytolacca</i>	Sorrowful Tree	<i>Nasturtium</i>
Sea Laurel	<i>Xylophylla</i>	Sour Gourd	<i>Adansonias</i>
Sea Lavender	<i>Statice</i>	Sour Gourd, Ethiopian	<i>Adansonias</i>
Sea Onion	<i>Scilla</i>	Sour Sop	<i>Annona</i>
Sea Pea	<i>Pisum</i>	Southernwood	<i>Artemisia</i>
Sea Pink	<i>Cerastium</i>	South-Sea Bread-Fruit Tree	<i>Artocarpus</i>
Sea Pigeon-pea	<i>Sophora</i>	South-sea Tea	<i>Ilex</i>
Sea Purslane	<i>Atriplex</i>	Snow Bread	<i>Cyclamen</i>
Sea-side Grape	<i>Coccoloba</i>	Spanish Broom	<i>Spartium</i>
Seal, Solomon's	<i>Convallaria</i>	Spanish Elm	<i>Cordia</i>
Sebasten	<i>Cordia</i>	Spanish Potatoes	<i>Convolvulus</i>
Sedum, Lesser Houseleek	<i>Sedum</i>	Sparagus	<i>Asparagus</i>
Sedum Tree	<i>Semprevivum</i>	Sparrow Wort	<i>Passerina</i>
Sena	<i>Cassia</i>	Spearage	<i>Asparagus</i>
Senega, Rattle-snake Root	<i>Polygala</i>	Spear, King's	<i>Asphodelus</i>
Sengreen	<i>Saxifraga</i>	Spearwort	<i>Mentha</i>
Senna	<i>Cassia</i>	Speedwell	<i>Veronica</i>
Senna, Bladder	<i>Culitra</i>	Sperage	<i>Asparagus</i>
Senna, Scorpion	<i>Coronilla</i>	Spice, All	<i>Myrtus</i>
Senna, Wild	<i>Cassia</i>	Spice, Carolina All	<i>Calycanthus</i>
Sensitive Plant	<i>Mimosa</i>	Spider Wort	<i>Anthericum</i>
Sensitive Plant, Bastard	<i>Aschynomene</i>	Spider Wort, Virginia	<i>Tradescantia</i>
Service Tree	<i>Sorbus</i>	Spikenard	<i>Baccharis</i>
Service Tree, Bird's	<i>Sorbus</i>	Spinach	<i>Spinacia</i>
Service Tree, Sweet	<i>Sorbus</i>	Spinach, Strawberry	<i>Blitum</i>
Service Tree, Maple-leaved	<i>Crataegus</i>	Spindle Tree	<i>Eunymus</i>
Service Tree, Wild	<i>Crataegus</i>	Spindle Tree, Bastard	<i>Celastrus</i>
Shaddock	<i>Citrus</i>	Spiriting Cucumber	<i>Momordica</i>
Shallot	<i>Allium</i>	Spiraea Frutex	<i>Spiraea</i>
Shot, Indian	<i>Canna</i>	Spiraea, African	<i>Diosma</i>
Siberian Crab	<i>Purus</i>	Sponge Tree	<i>Mimosa</i>
Side-saddle Flower	<i>Sorracenia</i>	Spoon Wort	<i>Cochlearia</i>
Silk Cotton Tree	<i>Bombax</i>	Spruce Fir	<i>Pinus</i>
Silk, Virgin	<i>Periploca</i>	Spurge	<i>Euphorbia</i>
Silver Bush	<i>Anthyllus</i>	Spurge Laurel	<i>Daphne</i>
Silver Fir	<i>Pinus</i>	Spurge Olive	<i>Daphne</i>
Silver Tree	<i>Protea</i>	Squash Gourd	<i>Cucurbita</i>
Smaller's Joy	<i>Verbena</i>	Squill	<i>Scilla</i>
Skirret	<i>Sam</i>	Squill, Lesser White	<i>Pancratium</i>
Skull Cap	<i>Scutellaria</i>	Squirting Cucumber	<i>Momordica</i>
Sky Flower	<i>Ciperaria</i>	Staff Tree	<i>Ceanothus</i>
Slipper, Lady's	<i>Cypripedium</i>	Stag's Horn Tree	<i>Rhus</i>
Slipper Wort	<i>Cucularia</i>	Star Apple	<i>Chrysophyllum</i>
Smilax	<i>Apium</i>	Star Flower	<i>Amellus</i>
Snail Flower	<i>Phacelia</i>	Star Flower	<i>Ornithogalum</i>
Snail Plant	<i>Medicago</i>	Star Hyacinth	<i>Scilla</i>
Snail Trefoil	<i>Medicago</i>	Star of Bethlehem	<i>Ornithogalum</i>
Snake, Cucumber	<i>Cucurbita</i>	Star of Naples	<i>Ornithogalum</i>
Snake, Gourd	<i>Tricomanthes</i>	Star Thistle	<i>Centaurea</i>
Snake Root	<i>Aristolochia</i>	Star Wort	<i>Aster</i>
Snake Root, Rattle	<i>Polygala</i>	Star Wort, Bastard	<i>Buphtalmum</i>
Snap Dragon	<i>Antirrhinum</i>	Stave's Acre	<i>Delphinium</i>
Snap Tree	<i>Justicia</i>	Stock, Dwarf, Annual	<i>Cheiranthus</i>
Sneeze Wort	<i>Achillea</i>	Stock Gill-flower	<i>Cheiranthus</i>
Snow-ball Tree	<i>Viburnum</i>	Stock, Ten Weeks	<i>Cheiranthus</i>
Snow-berry Tree	<i>Chiococca</i>	Stock, Virgin	<i>Cheiranthus</i>
Snow-drop	<i>Gubanthus</i>	Stonecrop	<i>Sedum</i>
Snow-drop, Greater	<i>Leucophaea</i>	Stonecrop Tree	<i>Chenopodium</i>
Snow-drop Tree	<i>Chionanthus</i>	Storax	<i>Styrac</i>
Soap Berry	<i>Sopinaus</i>	Storax, Liquid	<i>Liquidambar</i>
Soap-wort, American	<i>Rhecia</i>	Stramonium	<i>Datura</i>
Soap-wort	<i>Sommaria</i>	Strawberry	<i>Fragaria</i>
Soldier Wood	<i>Mimosa</i>	Strawberry Blite	<i>Blitum</i>
Solomon's Seal	<i>Convallaria</i>	Strawberry Spinach	<i>Blitum</i>

INDEX TO ENGLISH NAMES OF THE PLANTS.

Strawberry Tree.	<i>Arbutus</i>	Thorn Wax	<i>Rapheurum</i>
Styrax	<i>Liquidambar</i>	Throat	<i>Statice</i>
Siber	<i>Quercus</i>	Throat Wort	<i>Campanula</i>
Succory	<i>Cichorium</i>	Throat Wort, Blue Umbelliferous	<i>Trachelium</i>
Sugar Cane	<i>Saccharum</i>	Thuya	<i>Thuya</i>
Sugar Maple	<i>Acer</i>	Thyme	<i>Thymus</i>
Sultan Flower	<i>Centaurea</i>	Thyme, Mastic	<i>Satureia</i>
Sultan, Sweet	<i>Centaurea</i>	Thyme, Mother-of-	<i>Thymus</i>
Sumach	<i>Coriaria and Rhus</i>	Ticksseed Sun-flower	<i>Conopsis</i>
Sumach, Carrier's	<i>Coriaria</i>	Tinus	<i>Viburnum</i>
Sumach, Myrtle-leaved	<i>Coriaria</i>	Toad Flax	<i>Antirrhinum</i>
Summer Cypress	<i>Chenopodium</i>	Tobacco	<i>Nicotiana</i>
Sun Dew	<i>Drosera</i>	Tolu Tree	<i>Tolnifera</i>
Sun Flower	<i>Helianthus</i>	Tomatoes	<i>Solanum</i>
Sun Flower, Dwarf American	<i>Rudbeckia</i>	Toothach Tree	<i>Xanthoxylum</i>
Sunflower, Little	<i>Cistus</i>	Torch Thistle	<i>Cactus</i>
Sunflower, Tick-seeded	<i>Coropsis</i>	Touch me Not	<i>Impatiens</i>
Sun Spurge	<i>Euphorbia</i>	Touch me Not	<i>Momordica</i>
Superb Lily	<i>Gloriosa</i>	Toxicodendron	<i>Rhus</i>
Supple Jack	<i>Rhamnus</i>	Tragacanth, Gum	<i>Astragalus</i>
Swallow Wort	<i>Asclepias</i>	Traces, Ladies'	<i>Ophrys</i>
Swallow Wort, African	<i>Stapelia</i>	Trailing Arbutus	<i>Epigaea</i>
Sweet Apple	<i>Annona</i>	Traveller's Joy	<i>Clematis</i>
Sweet Briar	<i>Rosa</i>	Tree Celandine	<i>Baccharis</i>
Sweet Flag	<i>Acorus</i>	Tree Gennander	<i>Teucrium</i>
Sweet Gum	<i>Liquidambar</i>	Tree, Mallow	<i>Lavatera</i>
Sweet Johns	<i>Dianthus</i>	Tree, Primrose	<i>Oenothera</i>
Sweet Maundlin	<i>Achillea</i>	Tree of Life	<i>Thuya</i>
Sweet Pea	<i>Lathyrus</i>	Trefoil, Shrubby	<i>Ptelea</i>
Sweet Root	<i>Glycyrrhiza</i>	Trefoil, Moon	<i>Medicago</i>
Sweet Rush	<i>Acorus</i>	Trefoil, Snail	<i>Medicago</i>
Sweet Snp	<i>Annona</i>	Trefoil, Bean	<i>Cytisus</i>
Sweet Sultan	<i>Centaurea</i>	Trefoil, Tree	<i>Cytisus</i>
Sweet Weed	<i>Capraria & Scoparia</i>	Tricolor	<i>Amaranthus</i>
Sweet William	<i>Dianthus</i>	Tricolor	<i>Viola</i>
Sweet Willow	<i>Myrica</i>	Trumpet Flower	<i>Bignonia</i>
Sycamore Tree	<i>Acer</i>	Trumpet, Honeysuckle	<i>Lonicera</i>
Sycamorus Fig	<i>Ficus</i>	Tuberose	<i>Polyanthus</i>
Syringa	<i>Philadelphus</i>	Tulip	<i>Tulipa</i>
Tacamahaca	<i>Populus</i>	Tulip, African	<i>Hemantus</i>
Tallow Tree	<i>Croton</i>	Tulip, Chequered	<i>Fritillaria</i>
Tamarind Tree	<i>Tamarindus</i>	Tulip Flower	<i>Bignonia</i>
Tamarisk	<i>Tamarix</i>	Tulip Tree	<i>Liriodendron</i>
Tansy	<i>Tanacetum</i>	Tulip Tree, Laurel-leaved	<i>Magnolia</i>
Tar Tree	<i>Pinus</i>	Tupelo Tree	<i>Nissa</i>
Tarragon	<i>Artemisia</i>	Turkey Berry Tree	<i>Cordia</i>
Tartan-raire	<i>Daphne</i>	Turkey Wheat	<i>Zea</i>
Tea, Buckthorn	<i>Rhamnus</i>	Turk's Cap	<i>Lilium</i>
Tea, New Jersey	<i>Ceanothus</i>	Turnep	<i>Brassica</i>
Tea, New Zealand	<i>Philadelphus</i>	Turnep, French	<i>Brassica</i>
Tea, Oswego	<i>Monarda</i>	Turnep, Cabbage	<i>Brassica</i>
Tea, South Sea	<i>Ilex</i>	Turnep, Radish	<i>Raphanus</i>
Tea Tree	<i>Thea</i>	Turnsole	<i>Croton</i>
Tea, West Indian	<i>Sida</i>	Turnsole	<i>Heliotropium</i>
Thistle, Globe	<i>Echinops</i>	Turpentine Tree	<i>Pistacia</i>
Thistle, Melon	<i>Cactus</i>	Tutsan	<i>Hypericum</i>
Thistle, Torch	<i>Cactus</i>	Tway Blade	<i>Ophrys</i>
Thorn Apple	<i>Datura</i>	Twopence, Herb	<i>Lysimachia</i>
Thorn, Box	<i>Lycium</i>	Umbrella Tree	<i>Magnolia</i>
Thorn, Christ's	<i>Rhamnus</i>	Valerian	<i>Valeriana</i>
Thorn, Cockspur	<i>Crataegus</i>	Valerian, Greek	<i>Polemonium</i>
Thorn, Egyptian	<i>Acanthia</i>	Varnish Tree	<i>Rhus</i>
Thorn, Evergreen	<i>Mespilus</i>	Venus's Comb	<i>Scandix</i>
Thorn, Glastonbury	<i>Crataegus</i>	Venus's Fly Trap	<i>Dionaea</i>
Thorn, Goat's	<i>Tragacanthus</i>	Venus's Looking-glass	<i>Campanula</i>
Thorn, Haw	<i>Crataegus</i>	Venus's Navel-wort	<i>Cynoglossum</i>
Thorn, Lily	<i>Catesbea</i>	Vervain	<i>Verbena</i>
Thorn, Purgig	<i>Rhamnus</i>	Vervain Mallow	<i>Malva</i>
Thorn, White	<i>Crataegus</i>	Vetch, Bitter	<i>Orobus</i>
Thorny Trefoil	<i>Fagonia</i>		

INDEX TO THE ENGLISH NAMES OF THE PLANTS REPRESENTED IN THE PLATES.

Vetch, Liquorice	<i>Astragalus</i>	White Thorn	<i>Crataegus</i>
Vetch, Kidney	<i>Anthyllus</i>	Wicker Tree	<i>Sorbus</i>
Vetch, Knob-rooted Liquorice	<i>Glycyne</i>	Widow Wail	<i>Cneorum</i>
Viburnum, American	<i>Lantana</i>	Wild Olive	<i>Eleagnus</i>
Vine	<i>Vitis</i>	Willow	<i>Salix</i>
Vine, Black	<i>Tamus</i>	Willow, French	<i>Epilobium</i>
Violet	<i>Viola</i>	Willow Herb	<i>Lythrum</i>
Violet, Dame's	<i>Hesperis</i>	Willow Herb	<i>Lysimachia</i>
Violet, Damask	<i>Hesperis</i>	Willow, Spiked	<i>Spiraea</i>
Violet, Dog's Tooth	<i>Erythronium</i>	Willow, Sweet	<i>Myrica</i>
Viper Grass	<i>Scorzonera</i>	Wind Flower	<i>Anemone</i>
Virga Aurea	<i>Solidago</i>	Wind Seed	<i>Arctotis</i>
Virginian Acacia	<i>Robinia</i>	Winter's Bark	<i>Winteria</i>
Virginian Creeper	<i>Clematis</i>	Winter Berry	<i>Prinos</i>
Virginian Guelder Rose	<i>Spiraea</i>	Winter Bloom	<i>Azalea</i>
Virginian Pike	<i>Phytolacca</i>	Winter Cherry	<i>Physalis</i>
Virginian Silk	<i>Periplocu</i>	Winter Cherry	<i>Solanum</i>
Virgin's Bower	<i>Clematis</i>	Winter Savory	<i>Satureia</i>
Vitæ, Arbor	<i>Thuja</i>	Woodbine	<i>Lonicera</i>
Vitæ, Lignum	<i>Guaiacum</i>	Wood, Waxen	<i>Genista</i>
		Wormwood Tree	<i>Artemisia</i>
		Wood of Life	<i>Guaiacum</i>
		Wound Wort	<i>Achillea</i>
Wake Robin	<i>Arum</i>		
Wall Flower	<i>Cheiranthus</i>	Xiphium, Bulbous	<i>Iris</i>
Wall Pepper	<i>Sedum</i>	Xylosteum	<i>Lonicera</i>
Walnut Tree	<i>Juglans</i>		
Walnut Tree, Jamaica	<i>Hura</i>	Yapon	<i>Ilex</i>
Wartwort	<i>Euphorbia</i>	Yarrow	<i>Achillea</i>
Water-cress	<i>Sisymbrium</i>	Yarva Mora	<i>Bacca</i>
Water Lily	<i>Nymphaea</i>	Yew Tree	<i>Taxus</i>
Water Melon	<i>Cucurbita</i>		
Wayfaring Tree	<i>Viburnum</i>	Zealand Tea, New	<i>Philadelphus</i>
Wheat, Indian	<i>Zea</i>	Zerumbet	<i>Anonum</i>
Wheat, Turkey	<i>Zea</i>	Zimziber	<i>Anonum</i>
Whin	<i>Ulex</i>	Ziziphus	<i>Rhamnus</i>
Whin, Petty	<i>Genista</i>		
White Beam	<i>Crataegus</i>		
White Leaf	<i>Crataegus</i>		

INDEX

TO THE

ENGLISH NAMES OF THE PLANTS REPRESENTED IN THE PLATES.

		Fig. Pl.			Fig. Pl.
A FRICAN Agapanthus	<i>Agapanthus Umbellatus</i>	1 3	Blue-Flowered Lathyrus	<i>Lathyrus Sativus</i>	2 33
African Lily	<i>Agapanthus</i>	2 4	Blus Greek Valerian	<i>Polemonium Ceruleum</i>	2 44
Albuca, Lesser	<i>Albuca Minor</i>	1 13	Box-leaved Milk Wort	<i>Polygala Chamae-Burus</i>	2 45
Allspice, Carolina	<i>Catycanthus Floridus</i>	2 23	Broom, Spanish	<i>Spartium Juncum</i>	3 54
Alpine Eryngo	<i>Eryngium Alpinum</i>	2 41	Bugloss, Officinal	<i>Anchusa Officinalis</i>	2 2
Alpine Soldanella	<i>Soldanella Alpina</i>	2 28	Bulbocodium, Spring	<i>Bulbocodium Vernum</i>	2 11
Althea Frutex	<i>Hibiscus Syriacus</i>	2 5	Calla, Ethiopian	<i>Calla Aethiopica</i>	1 12
Alyssum, Yellow	<i>Alyssum Saxatile</i>	1 57	Campanula, Nettle-leaved	<i>Campanula Rapunculoides</i>	1 14
American Globe Flower	<i>Trollius Americanus</i>	4 2	Canadian Columbine	<i>Aquilegia Canadensis</i>	3 2
American Herb Christopher	<i>Actaea Racemosa</i>	1 33	Candy Tuft (Gibraltar)	<i>Iberis Gibraltaria</i>	2 29
Annual Lavatera	<i>Lavatera Trimestris</i>	1 10	Canne-leaved Strelitzia	<i>Strelitzia Regina</i>	2 53
Ash-leaved Trumpet Flower	<i>Bignonia Radicans</i>	2 3	Cardinal Flower	<i>Lobelia Cardinalis</i>	1 35
Asphodel, Yellow	<i>Asphodelus Luteus</i>	1 7	Carolina Allspice	<i>Catycanthus Floridus</i>	1 13
Aster, Italian	<i>Aster Amellus</i>	1 12	Chaste Tree, Five-leaved	<i>Vitis Negundo</i>	2 60
Aethiopian Calla	<i>Calla Aethiopica</i>	2 15	Chelone, Red-flowered	<i>Chelone Obliqua</i>	1 15
Autumnal Crocus	<i>Colchicum Autumnale</i>	2 9	Cherry, Water	<i>Physalis Alkekengi</i>	3 45
Azalea, Scarlet	<i>Azalea Nudifera Coccinea</i>	2 51	Chinese Ixia	<i>Ixia Chinensis</i>	1 29
		3 2	Chinese Water Lily	<i>Nelumbium Speciosum</i>	1 38
Bell-flowered Squill	<i>Scilla Campanulata</i>	3 15	Cobweb Houseleek	<i>Sempervivum Arachnoideum</i>	1 53
Berry-headed Strawberry Blite	<i>Blitum Capitatum</i>		Columbine, Canadian	<i>Aquilegia Canadensis</i>	3 2
Blue Catananche	<i>Catananche Cerulea</i>				

INDEX TO THE ENGLISH NAMES OF THE PLANTS REPRESENTED IN THE PLATES.

	Fig. Pl.		Fig. Pl.
Columbine, Feathered	3 56	Kalmia, Glauca	1 31
Common Bladder Senna	2 18	Laburnum	2 18
Common Passion Flower	2 43	Large-flowered Gentian	1 26
Common Philadelphus	1 43	Larkspur	1 21
Convolvulus, Small Blue	3 14	Lathyrus, Blue-flowered	2 33
Creeping Money Wort	3 34	Laurustinus	2 59
Creeping-rooted Hedysarum	2 32	Lavatera, Annual	1 33
Crocus, Autumnal	2 15	Lesser Albucca	2 4
Crocus, Spring	2 19	Lilac	1 50
Crown, Imperial	1 25	Lily, Chinese Water	1 38
Cyclamen, Persian	1 19	Lily-of-the-Valley	1 16
		Lily, Town	1 28
Dahlia, Purple	1 19*	Lily, White	2 35
Dahlia, Yellow	2 19*	Lobe-leaved Meadow Sweet	1 55
Daphne, Trailing	1 20	Love-in-a-Mist	1 37
Devil-in-a-Bush	1 37	Lung-Wort, Virginian	2 48
Dingy-Flowered Glycine	2 26	Lychnis, Scarlet	1 34
Dittany of Crete	2 39		
Dodecatheon, Mead's	1 22	Madagascar Periwinkle	1 59
Dog's Bane, Fly-catching	1 8	Marvel of Peru	1 36
Double Purple Groundsel	2 54	Meadow Sweet, Lobe-leaved	3 51
Dragon's Head, Virginian	2 20	Meat's Dodecatheon	1 22
		Mexican Argemone	1 9
Eastern Comfrey	1 48	Milk-Wort, Box-leaved	2 45
Eastern Poppy	1 42	Money-Wort, Creeping	3 34
Eryngo, Alpine	2 23		
Evergreen Orpine	1 52	Nettle-leaved Campanula	1 14
		New Jersey Tea Tree	3 13
Feathered Columbine	3 56	Nolana, Trailing	2 38
Feather, Prince's	2 7		
Five-leaved Chaste Tree	2 60	Official Bugloss	2 2
Five-leaved Pæony	2 40	Orange Apocynum	3 2
Flowering Rush	2 10	Oxlip	1 40
Fly-catching Dog's Bane	1 8		
Fretid St. John's Wort	2 27	Panicled Lychnidea	1 45
Fumitory, Hollow-rooted	2 25	Panicled Wachendorfia	1 60
		Pæony, Fine-leaved	2 40
Gentian, Large-flowered	1 26	Passion Flower, Common	2 43
German Iris	1 30	Perennial Sun-Flower	1 32
Gibraltar Candy Tuft	2 29	Periwinkle, Madagascar	1 59
Glaucous Kalmia	1 31	Persian Cyclamen	1 19
Globe Flower, American	1 57	Peru, Marvel of	1 36
Glycine, Dingy-flowered	2 26	Philadelphus, Common	1 43
Great-flowered Heath	1 24	Pontic Rhododendron	1 47
Great Globe Thistle	1 23	Poppy, Eastern	1 42
Great Honey Wort	2 16	Poppy, Yellow-horned	2 17
Greater Nasturtium	2 57	Prince's Feather	2 7
Green Hell-bore	1 27	Purple Dahlia	1 19*
Gum Cistus	1 17	Purple Rudbeckia	1 46
Hare's Ear, Shrubby	1 11	Red-flowered Chelone	1 15
Hawk Weed, Yellow	2 14	Red Valerian	1 58
Heath, Great-flowered	1 24	Rose Acacia	2 47
Hedysarum, Creeping-rooted	2 32	Rose Bay, Willow Herb	2 24
Hellebore, Green	1 27	Rose Campion	1 2
Hollow-rooted Fumitory	2 25	Rudbeckia, Purple	1 46
Honey Wort, Great	2 16	Rush, Flowering	2 10
Houseleek Cobweb	1 53		
		Sage, Indian	2 48
Imperial, Crown	1 25	Sarracenn, Yellow	2 50
Indian Sage	2 48	Savoy Anthemium	1 4
Iris, German	1 30	Scabious, Sweet	1 51
Iris, Various-coloured	2 30	Scarlet Azalea	2 9
Iris, Variegated	3 30	Scarlet-flowered Crassula	1 15
Iris-leaved Sisyrinchium	2 55	Scarlet Lobelia, or Cardinal Flower	1 36
Italian Aster	1 7	Scorpion Senna	2 12
		Sea Puccinotium	1 41
Jonquille	2 37	Senna, Scorpion	2 12

PLANTS REPRESENTED IN THE PLATES.

Fig.	Pl.			Fig.	Pl.
2	36	Thistle, Great Globe	<i>Echinops Sphaerocephalus</i>	1	23
2	5	Town Lily	<i>Heimerocallis Falsa</i>	1	28
1	2	Trailing Daphne	<i>Daphne Cneorum</i>	1	20
1	39	Trailing Nolana	<i>Nolana Prostrata</i>	2	38
2	58	Tree Flax	<i>Linum Arboreum</i>	2	31
2	46	Trumpet Flower, Ash-leaved	<i>Bignonia Radicans</i>	1	10
2	55				
3	14	Valerian, Red	<i>Valeriana Rubra</i>	1	38
2	41	Various-coloured Iris	<i>Iris Versicolor</i>	2	30
2	52	Variegated Iris	<i>Iris Variegata</i>	3	30
3	54	Virginian Dragon's Head	{ <i>Dracocephalum Virg- nianum</i> }	2	20
2	58				
1	56	Virginian Lung-wort	<i>Pulmonaria Virginica</i>	2	42
2	2				
2	19	Wachendorfia, Panicked	<i>Wachendorfia Paniculata</i>	1	6
2	34	Winter Cherry	<i>Physalis Alkekengi</i>	3	45
2	51	White Fraxinella	<i>Dictamnus Albus</i>	2	22
1	4	White Lily	<i>Lilium Candidum</i>	2	35
1	5	William, Sweet	<i>Dianthus Barbatas</i>	2	21
2	53	Willow-leaved Golden Rod	<i>Solidago Stricta</i>	3	41
1	32	Winged-podded Sophora	<i>Sophora Tetraptera</i>	2	52
1	51				
2	21	Yellow Alyssum	<i>Alyssum Saxatile</i>	2	3
1	44	Yellow Asphodel	<i>Asphodelus Luteus</i>	2	3
		Yellow Dahlia	<i>Dahlia Crocata</i>	2	19*
3	13	Yellow Hawk Weed	<i>Crepis Barбата</i>	2	14

INDEX

TO THE

PLANTS REPRESENTED IN THE PLATES.

Fig.	Pl.			Fig.	Pl.
1	1	<i>Cerithe Major</i>	Great Honey Wort	2	16
4	2	<i>Chelidonium Glaucum</i>	Yellow Horned Poppy	2	17
1	3	<i>Chelone Obliqua</i>	Red-flowered Chelone	1	15
1	2	<i>Cistus Ladaniferus</i>	Gum Cistus	1	17
2	4	<i>Colchicum Autumnale</i>	Autumnal Crocus	2	15
2	5	<i>Colutca Arboreascens</i>	Common Bladder Senna	2	13
2	7	<i>Convallaria Majalis</i>	Lily of the Valley	1	16
		<i>Convolutus Tricolor</i>	Small Blue Convolvulus	3	14
2	6	<i>Coronilla Emeris</i>	Scorpion Senna	2	12
2	2	<i>Crassula Coccinea</i>	Scarlet-flowered Crassula	1	18
1	4	<i>Crepis Barбата</i>	Yellow Hawk Weed	2	14
1	6	<i>Crocus Vernus</i>	Spring Crocus	2	19
2	8	<i>Cyclamen Persicum</i>	Persian Cyclamen	1	19
1	8	<i>Cytisus Laburnum</i>	Laburnum	2	18
3	2	<i>Dahlia Crocata</i>	Yellow Dahlia	2	19*
1	5	<i>Dahlia Pinnata</i>	Purple Dahlia	1	19*
1	9	<i>Daphne Cneorum</i>	Trailing Daphne	1	20
2	1	<i>Delphinium Elatum</i>	Larkspur	1	21
2	3	<i>Dianthus Barbatas</i>	Sweet William	2	21
1	7	<i>Dictamnus Albus</i>	White Fraxinella	2	22
2	9	<i>Dodecatheon Medea</i>	Mead's Dodecatheon	1	22
2	10	<i>Dracocephalum Virgi- nianum</i>	{ Virginian Dragon's Head }	2	20
1	10				
3	11	<i>Echinops Sphaerocephalus</i>	Great Globe Thistle	1	23
2	11	<i>Epilobium Angustifolium</i>	Rose-bay Willow Herb	2	24
1	11	<i>Erica Grandiflora</i>	Great-flowered Heath	1	24
2	10	<i>Eryngium Alpinum</i>	Alpine Eryngo	2	23
1	12				
1	13	<i>Fritillaria Imperialis</i>	Crown Imperial	1	25
1	14	<i>Fumaria Cava</i>	Hollow-rooted Fumitory	2	25
3	15	<i>Gentiana Acaulis</i>	Large-flowered Gentian	1	26
3	13	<i>Glycine Rubicunda</i>	Dirty-flowered Glycine	2	26

INDEX TO THE GARDEN APPARATUS, BUILDINGS, &c. REPRESENTED IN THE PLATES.

		Fig. Pl.			Fig. Pl.
<i>Hedysarum Obscurum</i>	Creeping-rooted Hedysarum	2 32	<i>Polemonium Canadense</i>	Blue Greek Valerian	2 44
<i>Helianthus Multiflorus</i>	Perennial Sun-flower	1 32	<i>Polygala Chamae-Borus</i>	Box-leaved Milkwort	2 43
<i>Helleborus Viridis</i>	Green Hellebore	1 27	<i>Primula Veris</i>	Oxlip	1 40
<i>Homocallis Fulea</i>	Town Lily	1 28	<i>Pulmonaria Virginica</i>	Virginian Lungwort	2 42
<i>Hibiscus Syriacus</i>	Althea Frutex	2 28			
<i>Hypericum Hircinum</i>	Faetid St. John's Wort	2 27	<i>Rhododendron Ponticum</i>	Pontic Rhododendron	1 47
			<i>Robinia Hispidia</i>	Rose Acacia	2 47
<i>Iberis Gibraltaria</i>	Gibraltar Candy Tuft	2 29	<i>Rosa Lutea</i>	Single Yellow Rose	2 46
<i>Iris Germanica</i>	German Iris	1 30	<i>Rudbeckia Purpurea</i>	Purple Rudbeckia	1 46
<i>Iris Versicolor</i>	Various-coloured Iris	2 30			
<i>Iris Variegata</i>	Variegated Iris	3 30	<i>Salvia Indica</i>	Indian Sage	1 48
<i>Ixia Chinensis</i>	Chinese Ixia	1 29	<i>Sanguinaria Canadensis</i>	Canada Puccoon	1 49
<i>Kalmia Glauca</i>	Glaucous Kalmia	1 31	<i>Sarracena Flava</i>	Yellow Sarracena	2 50
			<i>Saxifraga Crassifolia</i>	Oval-leaved Saxifrage	2 49
<i>Lathyrus Sativus</i>	Blue-Flowered Lathyrus	2 33	<i>Scabiosa Atropurpurea</i>	Sweet Scabious	1 51
<i>Lavatera Trimestris</i>	Annual Lavatera	1 33	<i>Scilla Campanulata</i>	Bell-flowered Squill	2 51
<i>Leucojum Vernalum</i>	Spring Snowflake	2 34	<i>Sedum Anacampseros</i>	Evergreen Orpine	1 52
<i>Lilium Candidum</i>	White Lily	2 35	<i>Sempervivum Arachnoideum</i>	Cobweb Houseleek	1 53
<i>Lobelia Cardinalis</i>	Scarlet Lobelia, or Cardinal's Flower	1 35	<i>Senecio Elegans</i>	Double Purple Groundsel	2 54
<i>Linum Arborescens</i>	Tree Flax	2 31	<i>Sisyrinchium Iridioides</i>	Iris-leaved Sisyrinchium	2 55
<i>Lychnis Chalcedonica</i>	Scarlet Lychnis	1 34	<i>Soldanella Alpina</i>	Alpine Soldanella	2 41
<i>Lysimachia Nummularia</i>	Creeping Moneywort	3 34	<i>Solidago Stricta</i>	Willow-leaved Golden Rod	1 54
			<i>Sophora Tetraoptera</i>	Winged-podded Sophora	2 52
<i>Mimosa Sensitive</i>	Sensitive Plant	2 36	<i>Spartium Junceum</i>	Spanish Broom	3 54
<i>Mirabilis Jalapa</i>	Marvel of Peru	1 36	<i>Spiraea Lobata</i>	Lobe-leaved Meadow Sweet	1 55
<i>Monarda Didyma</i>	Scarlet Monarda	3 36	<i>Strelitzia Regina</i>	Canna-leaved Strelitzia	2 53
			<i>Symphytum Orientale</i>	Eastern Comfrey	1 48
<i>Narcissus Jonquilla</i>	Jonquil	2 37	<i>Syringa Vulgaris</i>	Lilac	1 50
<i>Nelumbium Speciosum</i>	Chinese Water Lily	1 38			
<i>Nigella Damascena</i>	Love-in-a-Mist	1 37	<i>Thalictrum Aquilegifolium</i>	Feathered Columbine	3 56
<i>Nolana Prostrata</i>	Trailing Nolana	2 38	<i>Tradescantia Virginica</i>	Virginian Spider Wort	1 56
			<i>Trillium Sessile</i>	Sessile Trillium	2 56
<i>Oenothera Fruticosa</i>	Shrubby Oenothera	1 39	<i>Trollius Americanus</i>	American Globe Flower	1 57
<i>Origanum Dictamnus</i>	Dittany of Crete	2 39	<i>Tropaeolum Majus</i>	Greater Nasturtium	2 57
<i>Paeonia Tenuifolia</i>	Fine-leaved Paeony	2 40	<i>Valeriana Rubra</i>	Red Valerian	1 58
<i>Pancreatum Maritimum</i>	Sea Pancreatum	1 41	<i>Veronica Sibirica</i>	Siberian Speedwell	2 58
<i>Papaver Orientale</i>	Eastern Poppy	1 42	<i>Viburnum Tinus</i>	Laurustinus	2 59
<i>Passiflora Cereola</i>	Common Passion Flower	2 43	<i>Vinca Rosea</i>	Madagascar Periwinkle	1 59
<i>Philadelphus Coronarius</i>	Syringa, or Mock Orange	1 44	<i>Viter Negundo</i>	Five-leaved Chaste Tree	2 60
<i>Philadelphus Coronarius</i>	Common Philadelphus	1 43			
<i>Phlox Paniculata</i>	Panicle Lychnidea	1 45	<i>Wachendorfia Paniculata</i>	Panicle Wachendorfia	1 60
<i>Physalis Alkekengi</i>	Winter Cherry	3 45			

INDEX

TO THE

GARDEN-APPARATUS, BUILDINGS, &c. REPRESENTED IN THE PLATES.

VOL. I.

- PLATE A.** Fig. 1. Mushroom Bed.—Fig. 2. Improved Bark-Pit.—Fig. 3. Section of—Fig. 4. Common Bark-Pit.—Fig. 5. Small Bark-Pit.
- B.** An Improved Conservatory.—Fig. 1. End Elevation.—Fig. 2. Section of Do.—Fig. 3. Longitudinal Section of Back-Wall.
- C.** Fig. 1. Ground Plan of Conservatory.—Fig. 2. Front Elevation of Do.
- D.** An Improved Cucumber-Frame.—Fig. 1. Ground Plan.—Fig. 2. Front Elevation.—Fig. 3. End Elevation.—Fig. 4. Longitudinal Section.—Fig. 5. Section showing Bark-Pit.—Fig. 6. Section showing Flue.
- E.** An Improved Melon-Frame or Pit.—Fig. 1. Ground Plan.—Fig. 2. Front Elevation.—Fig. 3. Section across the Bed.
- F.** A Plan for laying out Gardens in the most improved Manner.
- G.** An Improved Hothouse.—Fig. 1. Section showing Fire-Place and Construction of Flues, so as to produce the proper Heat with the least possible Con-

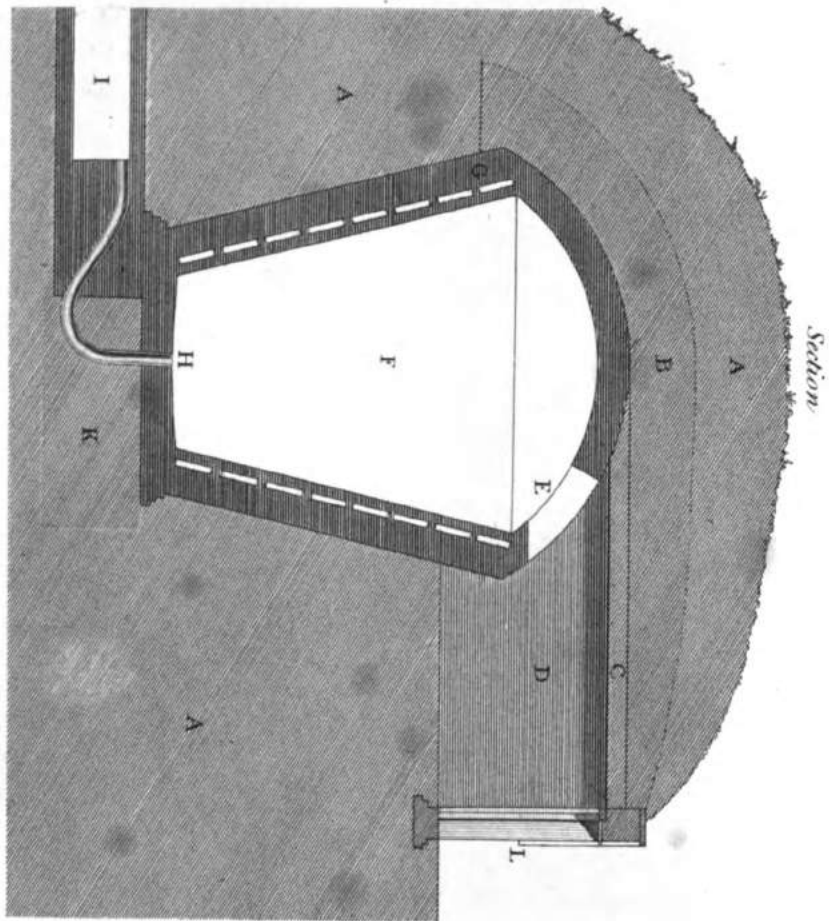
sumption of Fuel.—Fig. 2. is the Ground Plan.—Fig. 3. A Section showing the Form of the Bark-Pit, &c.

- PLATE H.** An Improved Hot-Wall.—Fig. 1. Ground Plan of Wall and Back-Shed.—Fig. 2. Longitudinal Section showing the Passage of the Flue.—Fig. 3. Section across the Wall.

VOL. II.

- A.** Fig. 1. Section of Improved Ice-House.—Fig. 2. Plan of Well on Level of Passage-Floor.—Fig. 3. Lower Plan of Well.—Fig. 4. Front Elevation of Entrance.
- B.** An Improved Stove, Peach and Succession-House.
- C.** Section and End Elevation of Hothouse, &c.—Fig. 1. and 2. Sections.—Fig. 3. End Elevation.
- D.** An Improved Vinery.—Fig. 1. shows the Front Elevation.—Fig. 2. is a Section of the End.—Fig. 3. is a Section showing the Flues.—Fig. 4. is the Plan.
- E.** Improved Implements of Gardening.

Fig. 1.



Lower Plan of Well

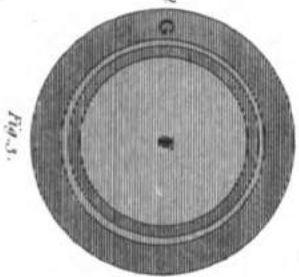
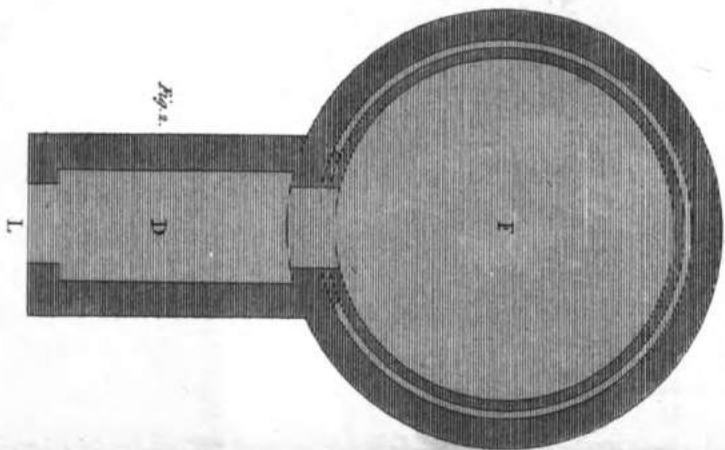
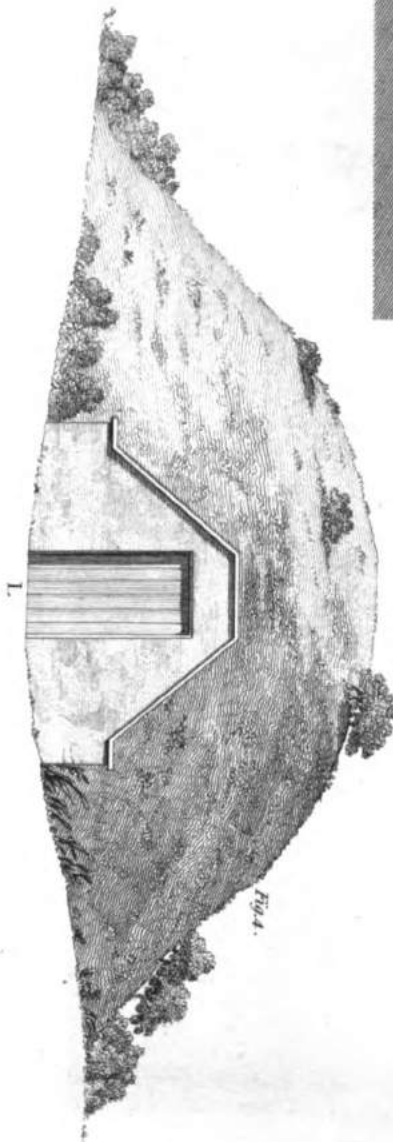


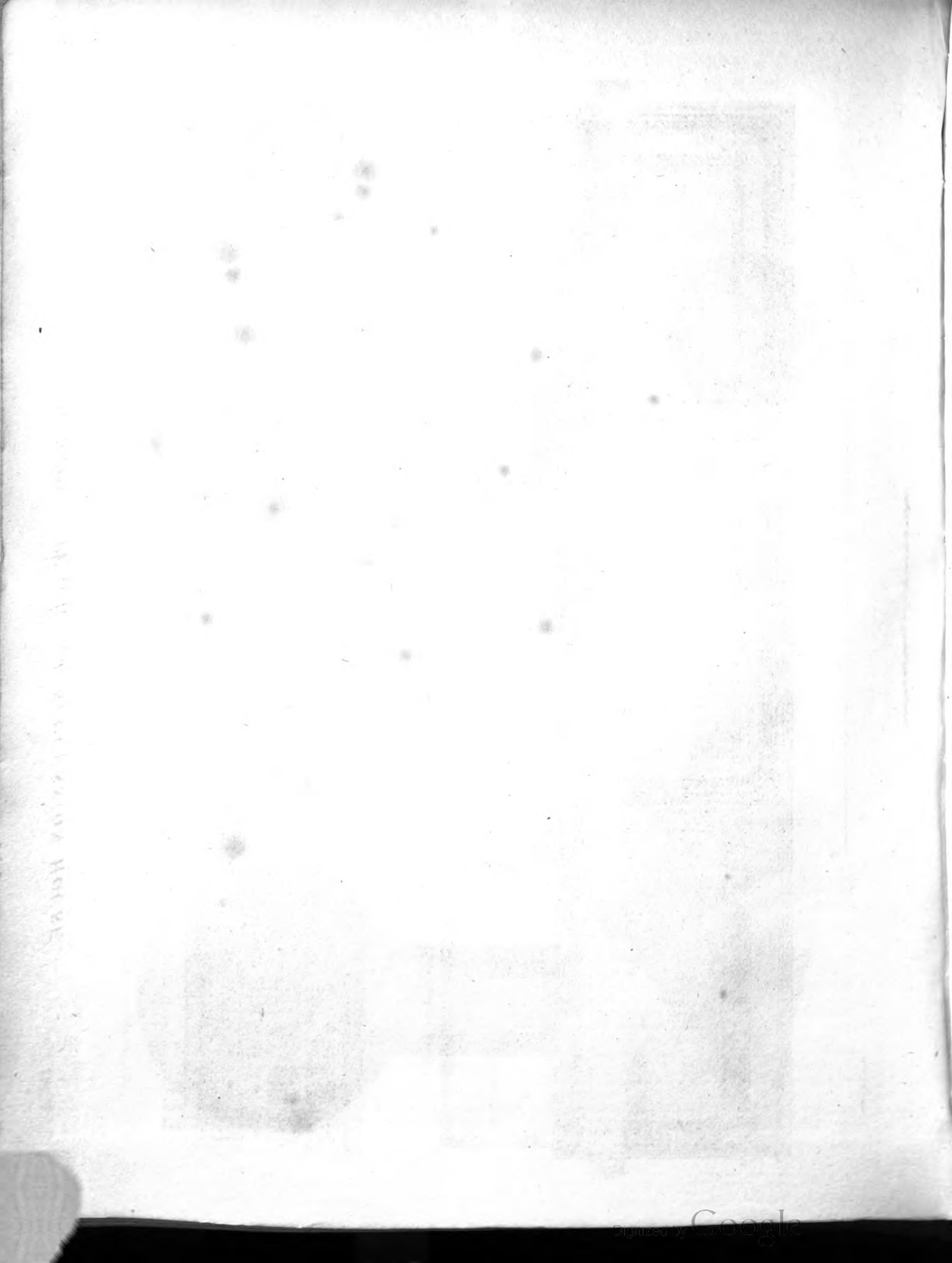
Fig. 2.



Front Elevation of Entrance

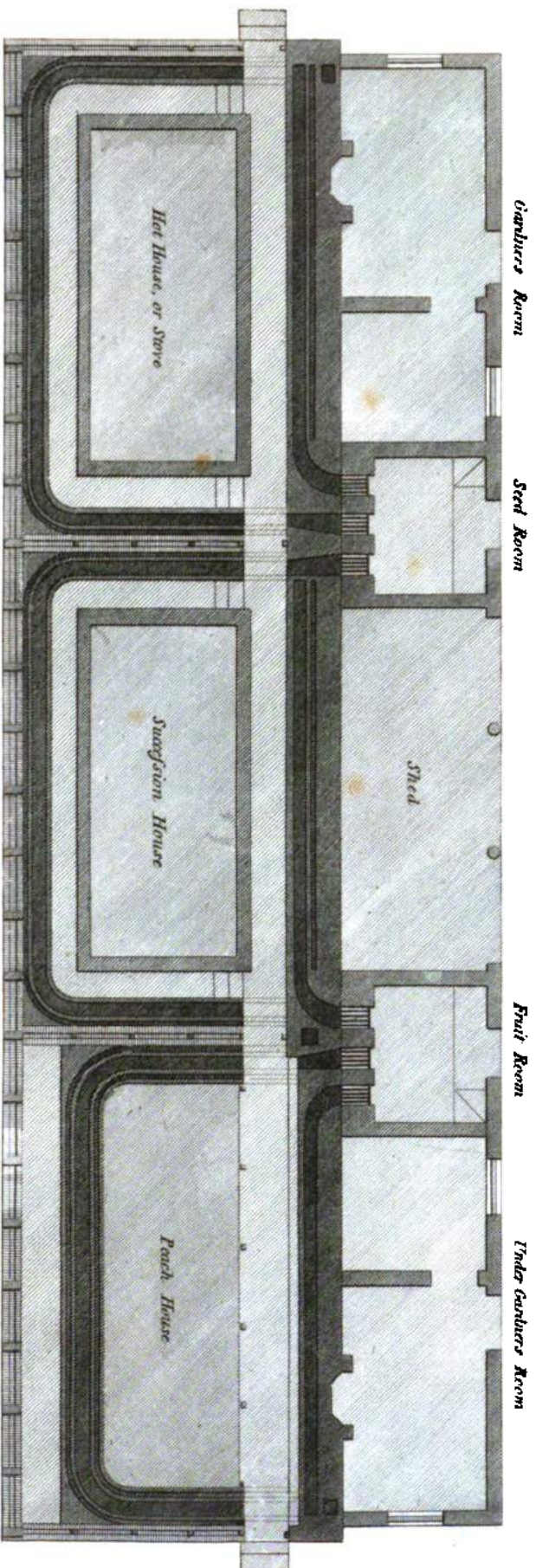
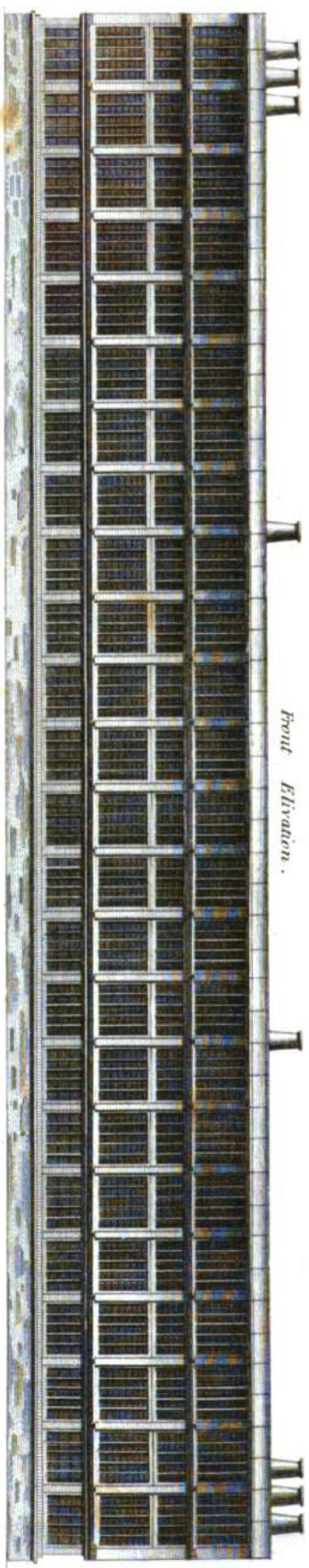


20' 10' 0' 10' 0' 10' 0'



IMPROVED STOVE, PEACH and SUCCESSION HOUSE.

Plan & Elevation.



Plan
in Feet

*Section and End Elevation
of HOT HOUSE. &c.*

Plate C. Vol. 2.

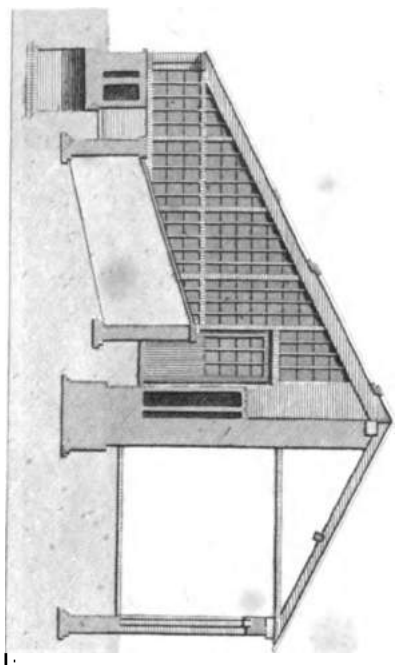


Fig. 1.

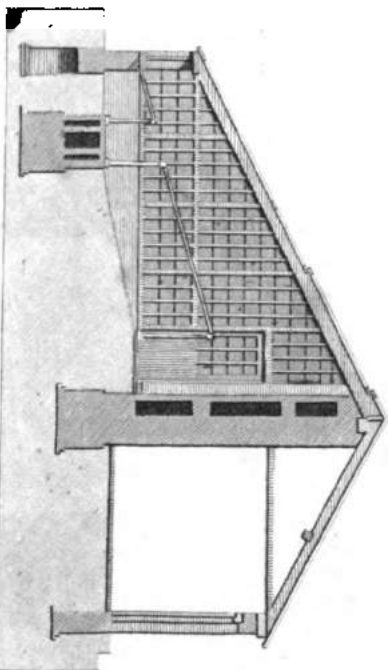


Fig. 2.

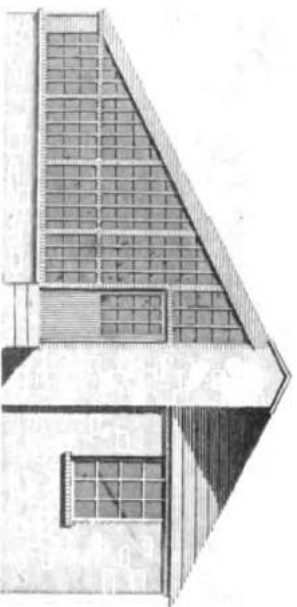
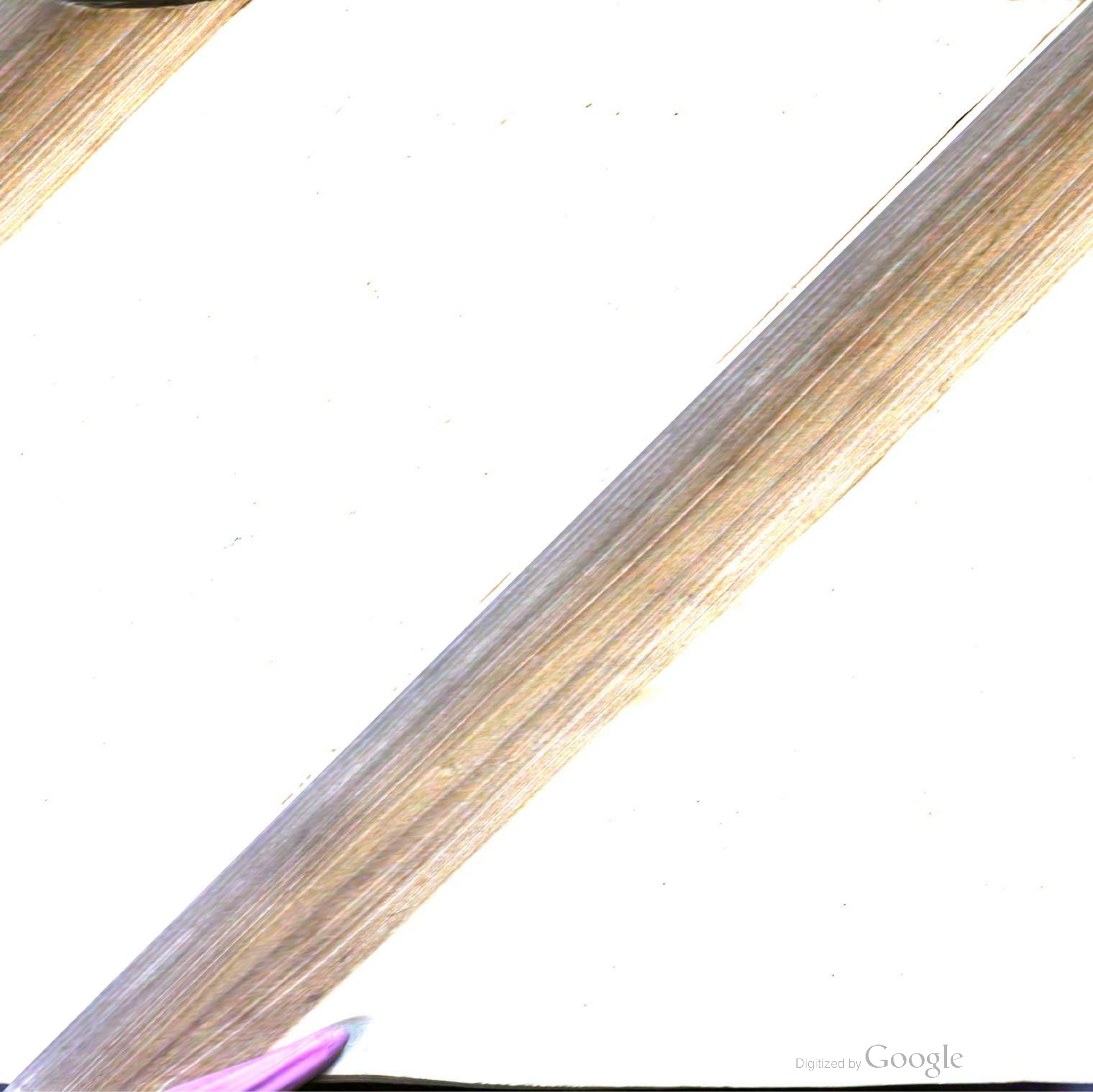


Fig. 3.

0 10 20 30 feet



VINERY or GRAPE HOUSE.

Fig. 1.

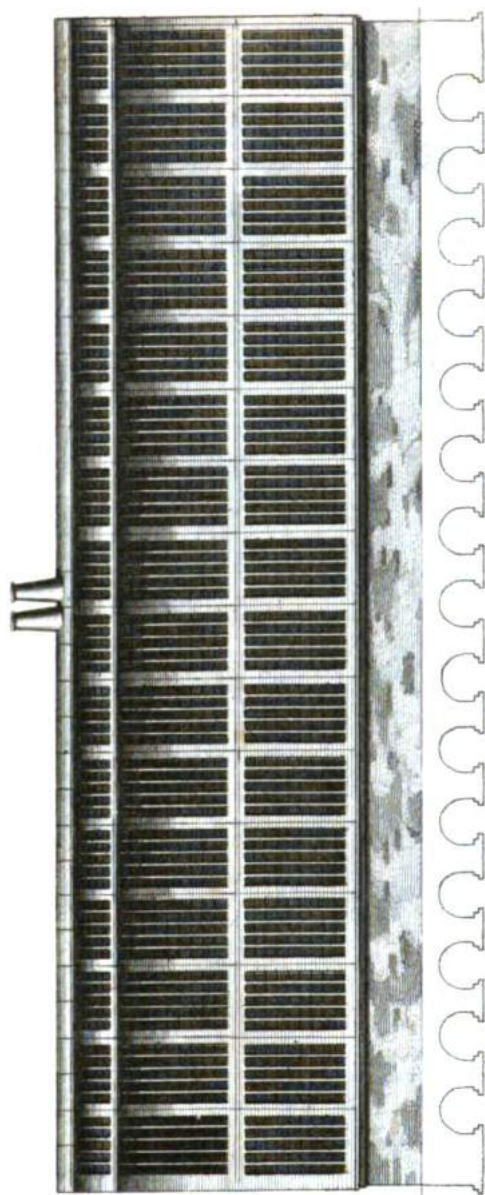


Fig. 2.

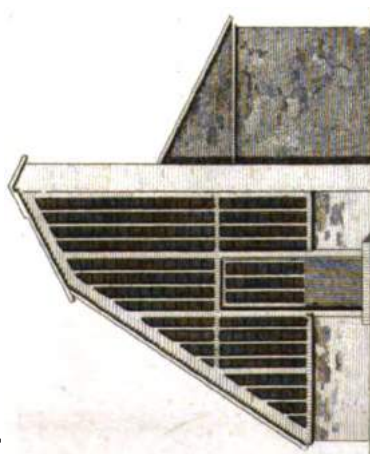


Fig. 4.

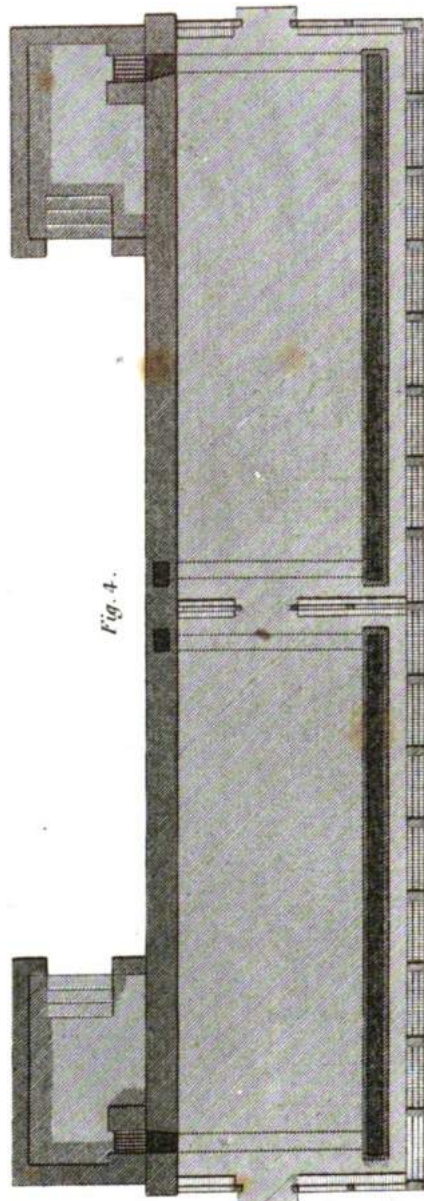
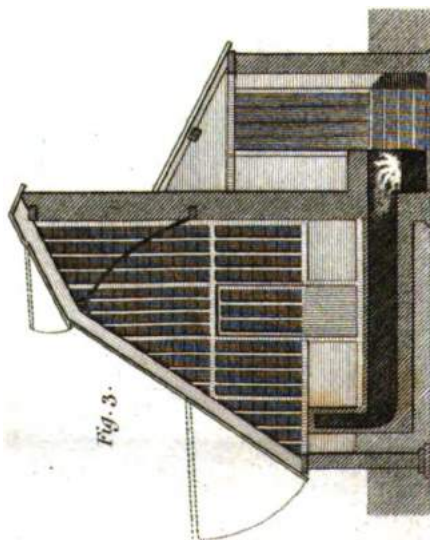


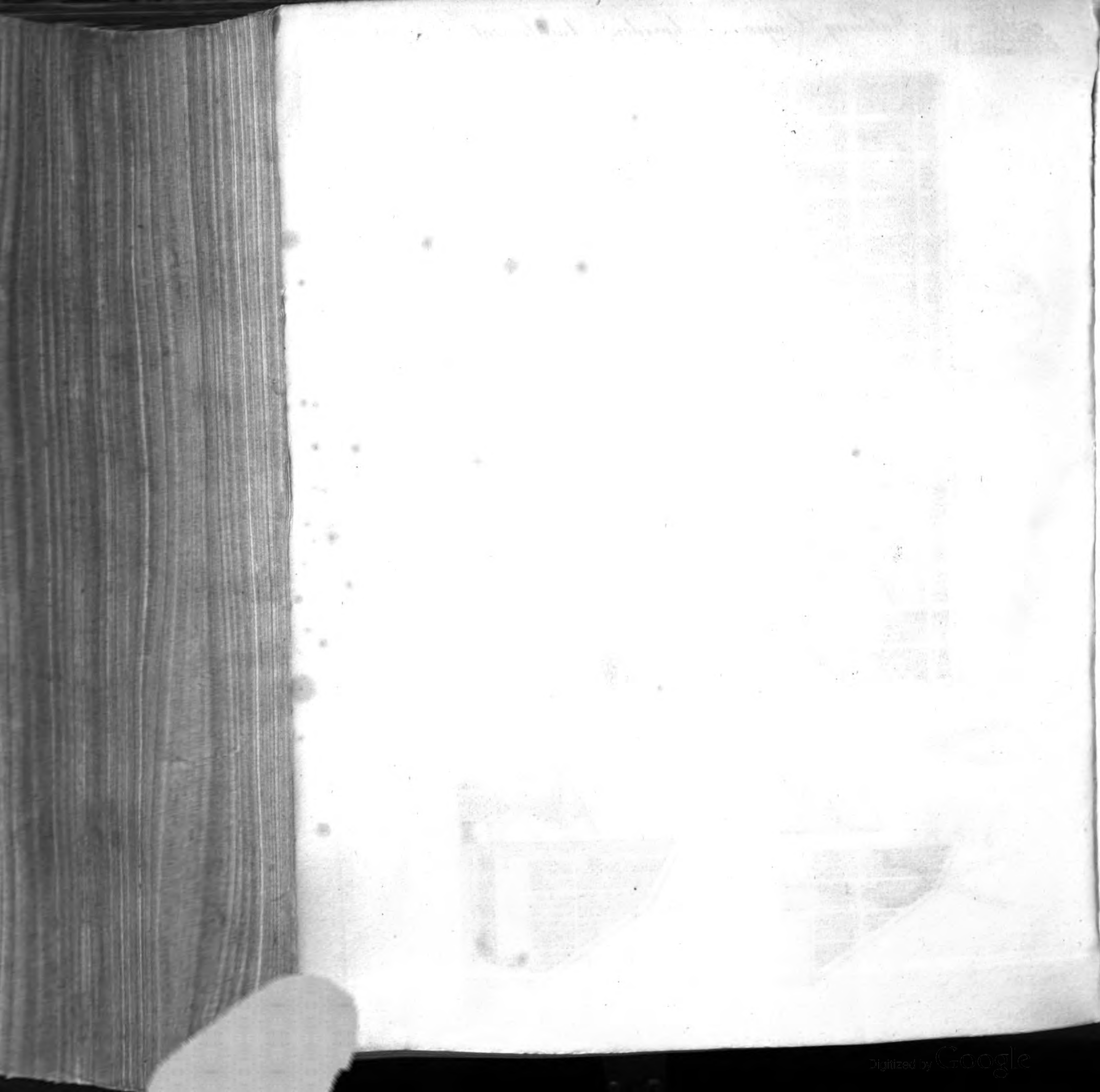
Fig. 3.

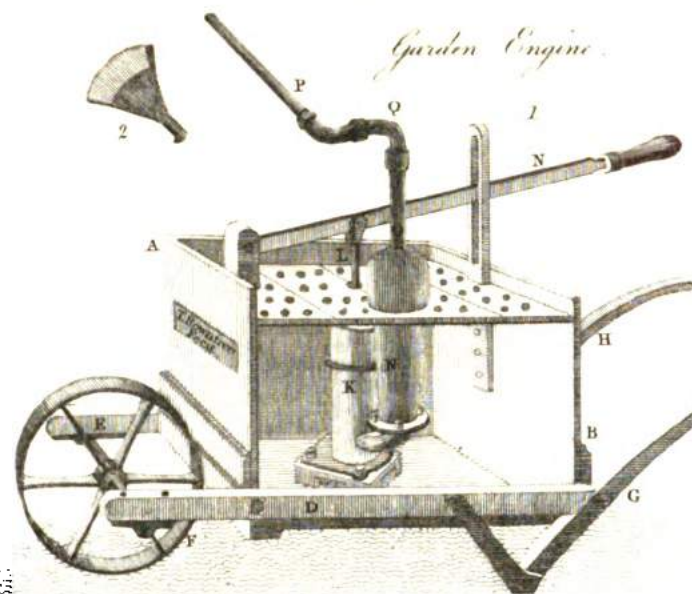


20 5 0 10 20 30 40 Feet.

Published by G. Knapp, 11, Fleet Street, London.

Printed & Engraved by G. Knapp.



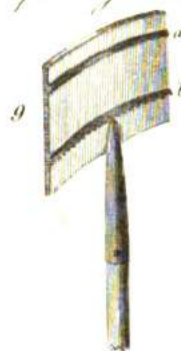


Garden Engine.

Pruning Knives



Moss Scraper for large branches



Double toothed Saw



Tool for scraping moss &c. from between trees & walls



Blunt Knife for scraping off moss &c.



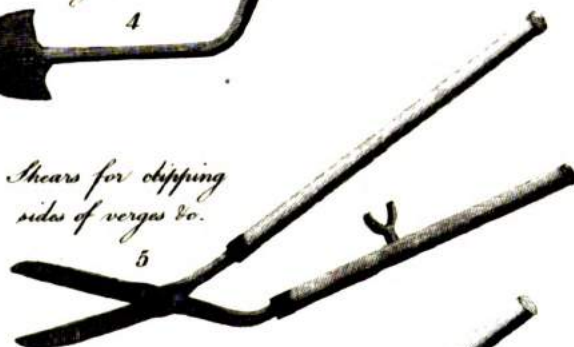
Racer for paring edges of Turves &c.



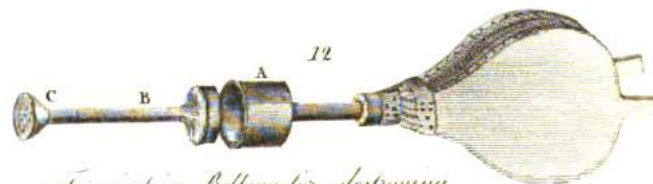
Turfing Iron for cutting turves.



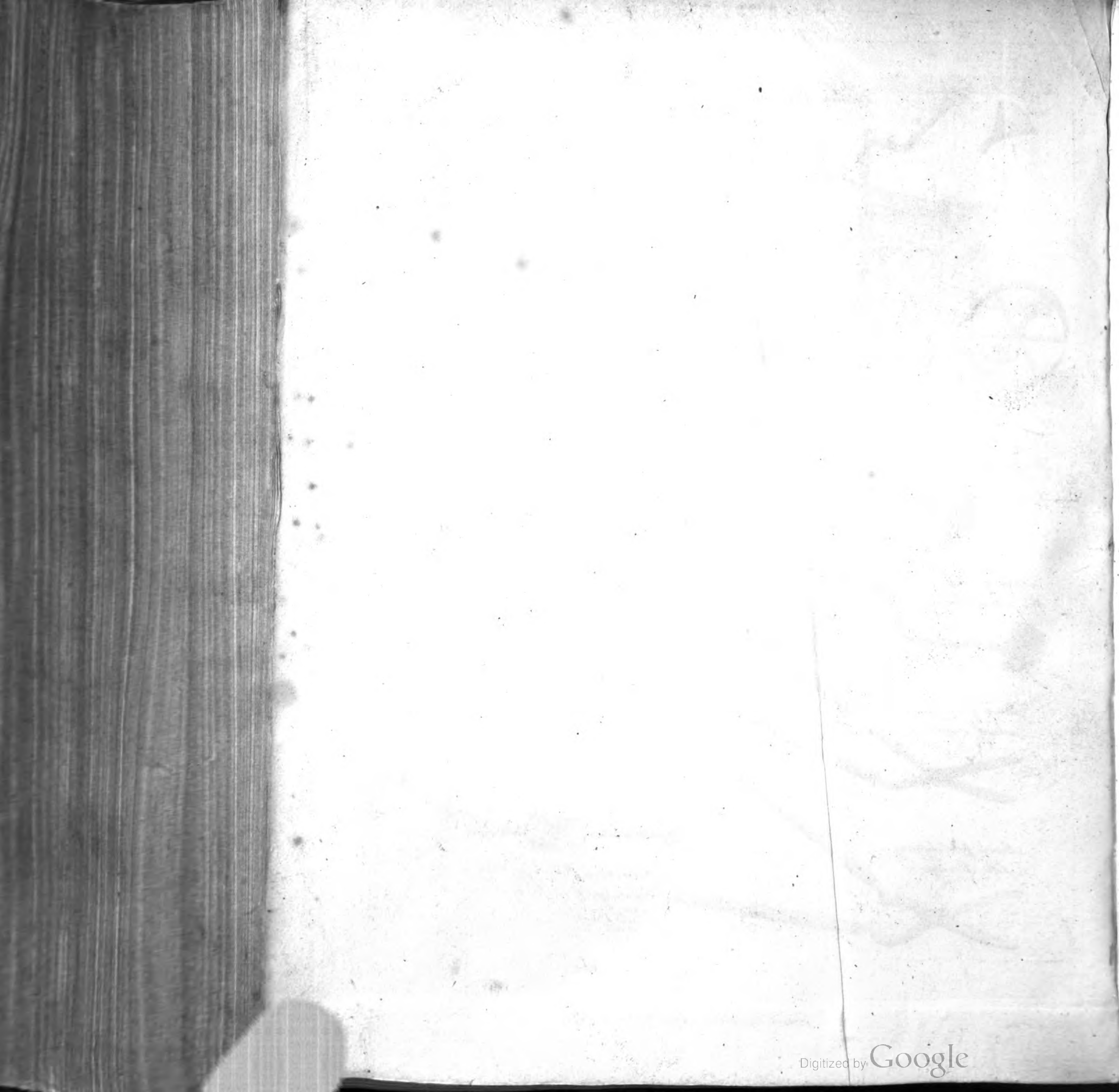
Shears for clipping sides of verges &c.

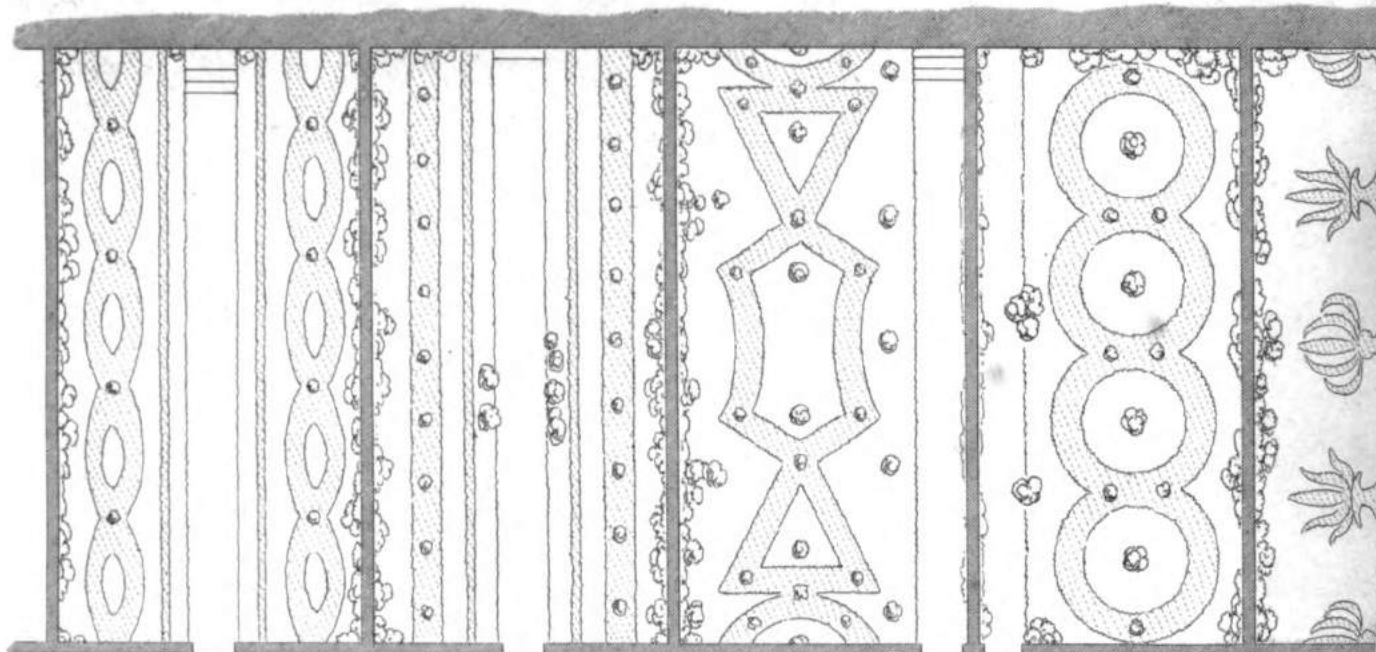


Shears for clipping tops of verges &c.



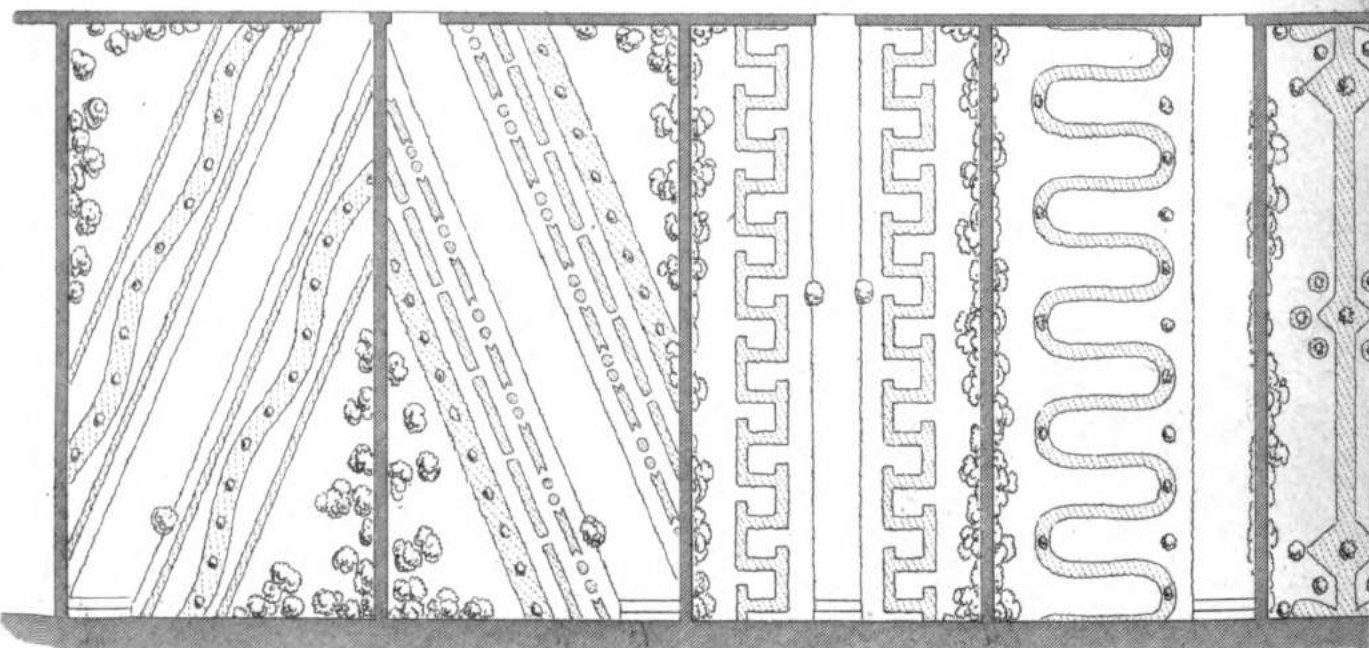
Fumigating Bellows for destroying Insects by the smoke of Tobacco &c.





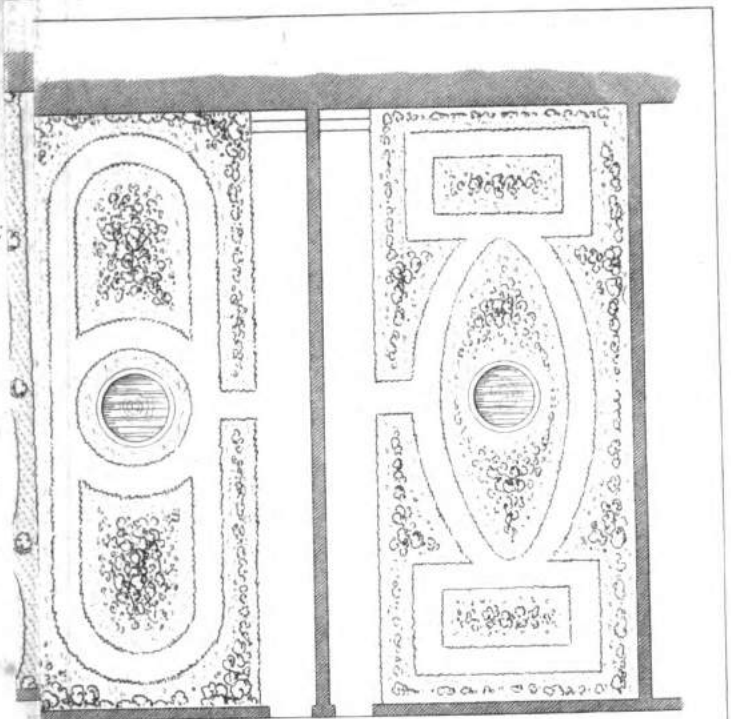
0 5 10 15 20 25 30 35 40 45

Parterres of Turf & Earth for small Ground Plans



London, Published by J. Harding 36 St. James's St. March 1781.

London, Published by J. Harding 36 St. James's St. March 1781.



et

ts

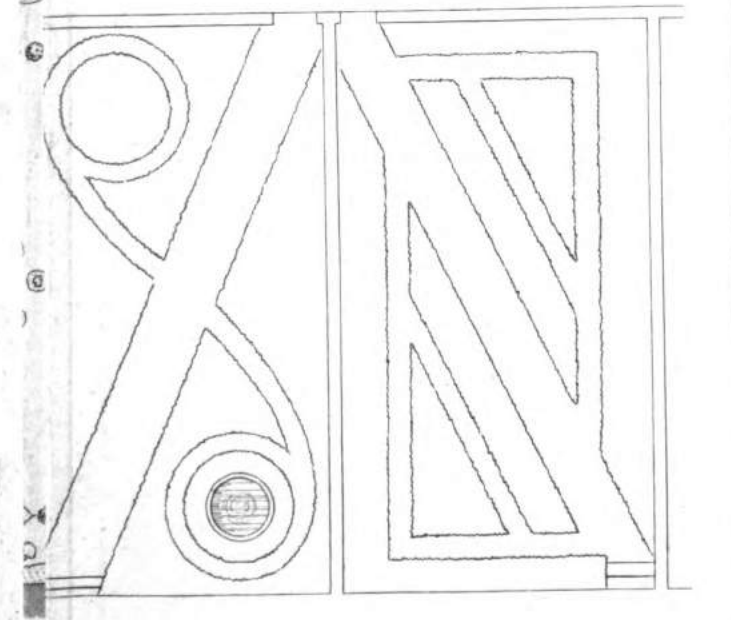
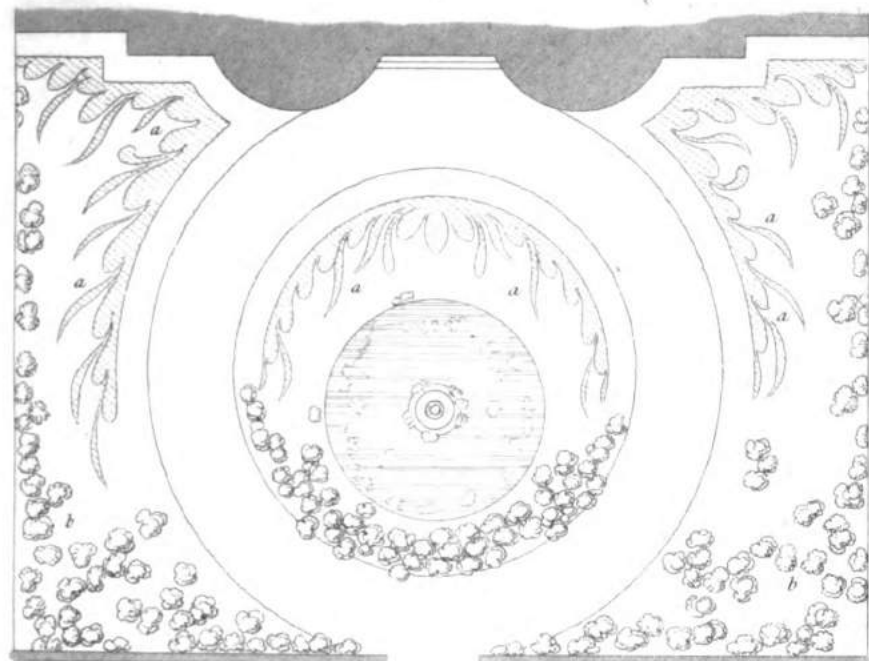
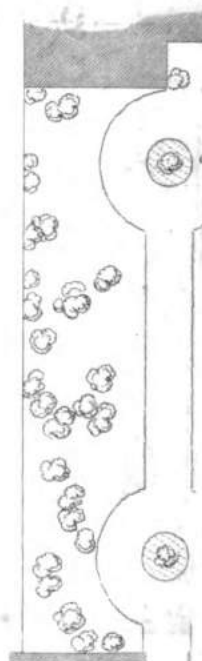


Fig. 1.



3 4 5 2 2 0 5 10 15 20 25 30 35 40 45 50 55 Feet



3 4 5 2 2 0 5 10 15 20 25 30 35 40 45 50 55 Feet

Fig. 3.

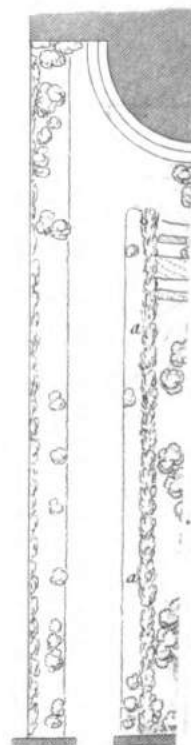
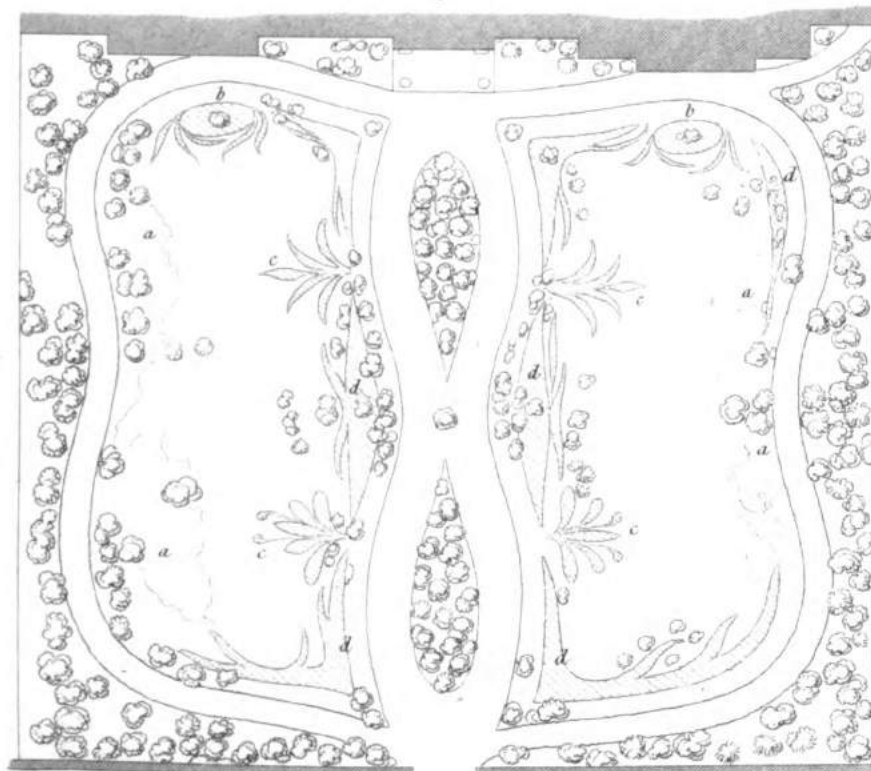


Fig. 2.

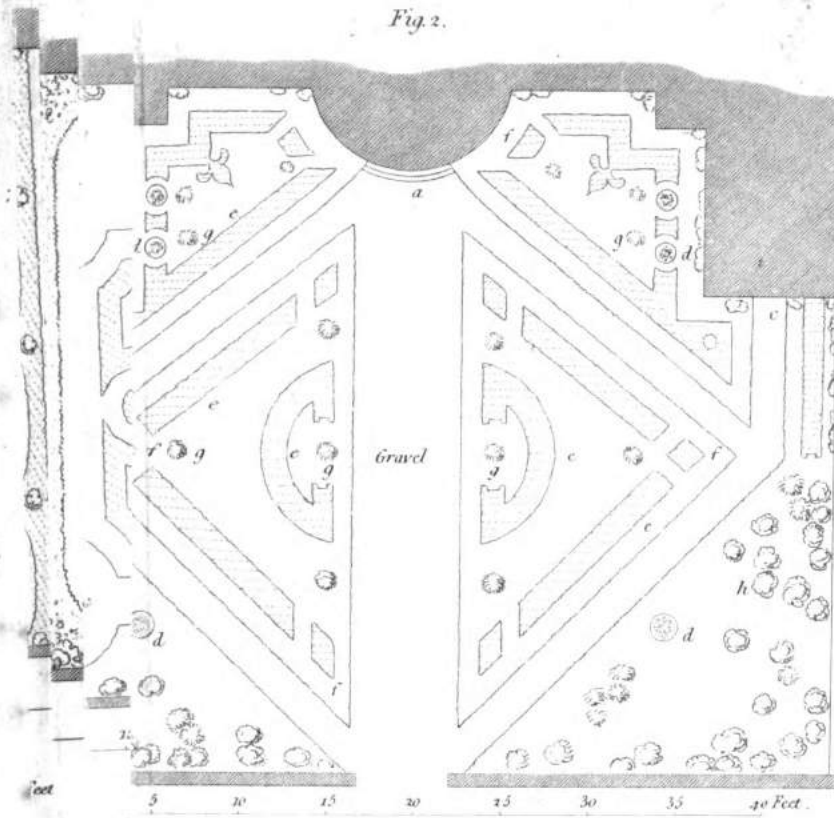


Fig. 4.

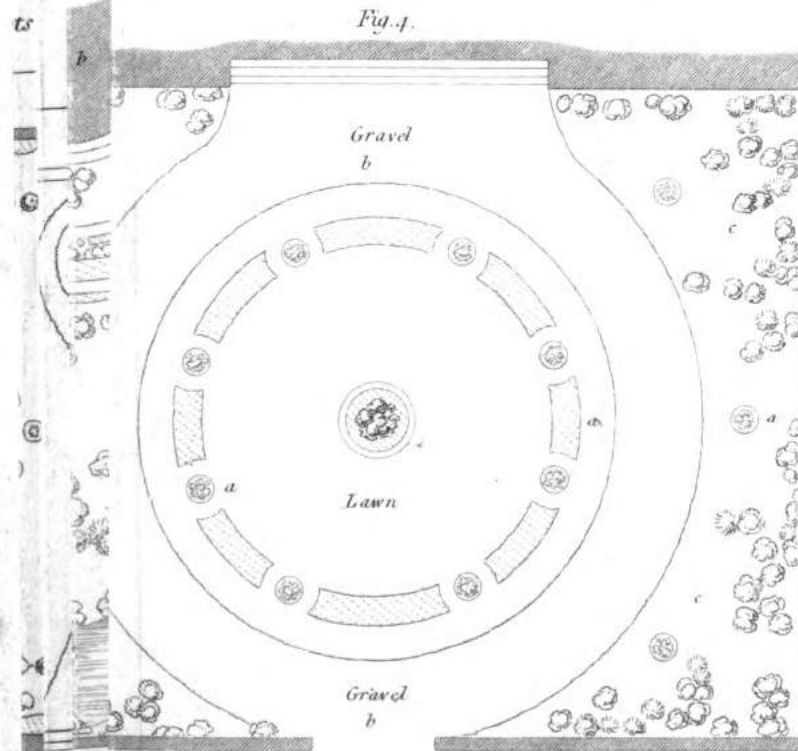


Fig. 1.

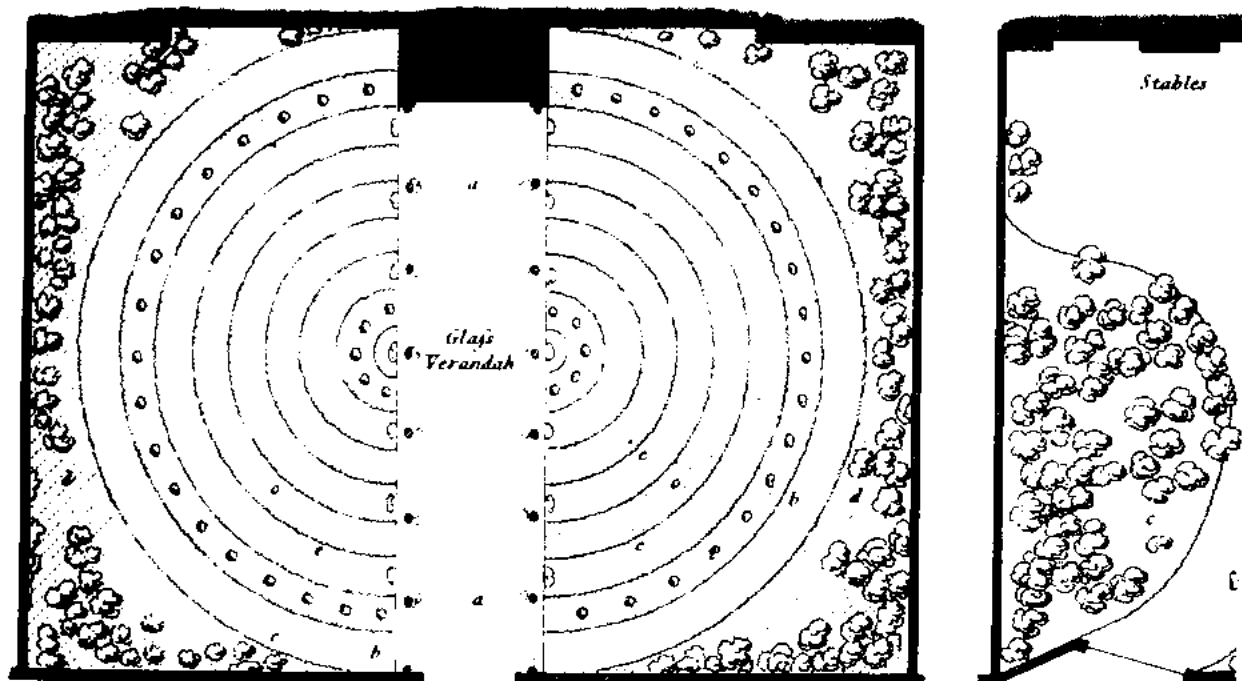


Fig. 2.

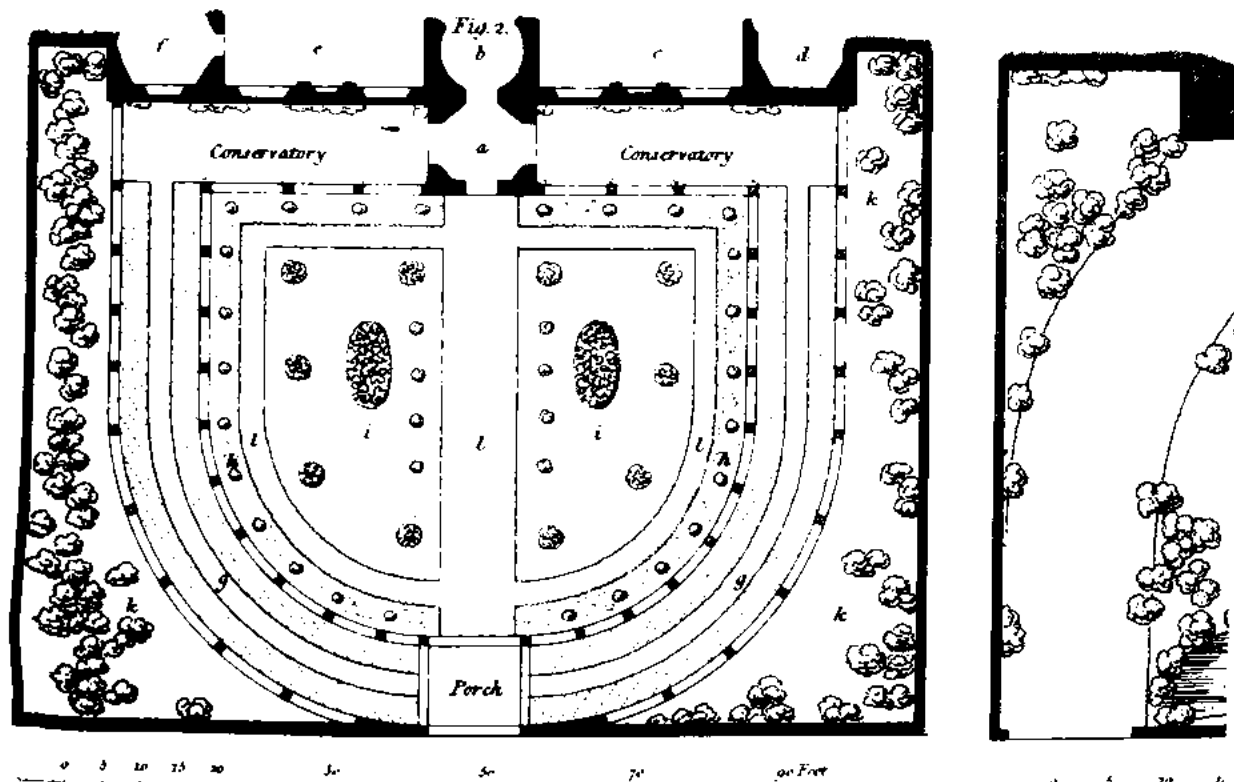


Fig. 2.

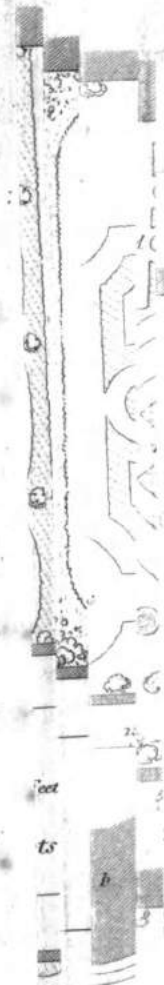


Fig. 3.

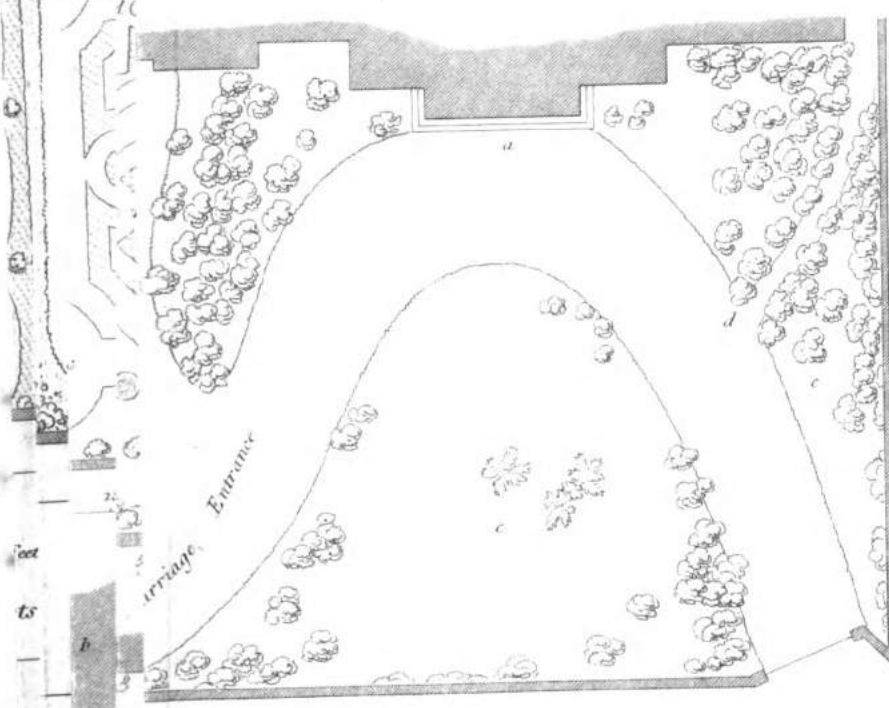


Fig. 4.

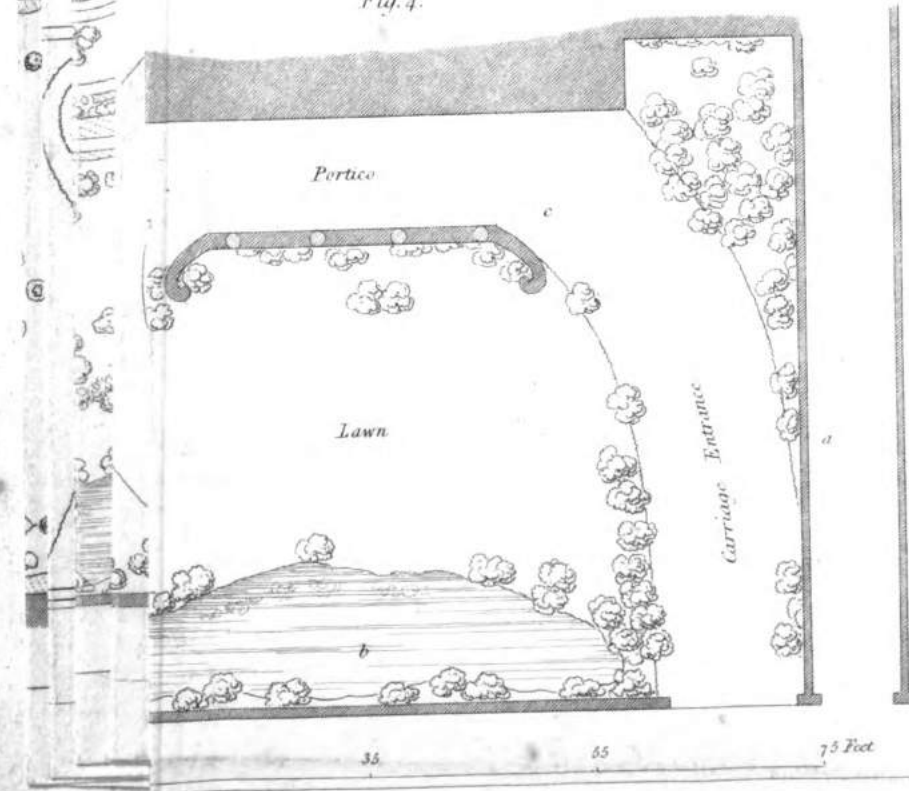


Fig. 1. Villa of 3 Acres in the Modern Style

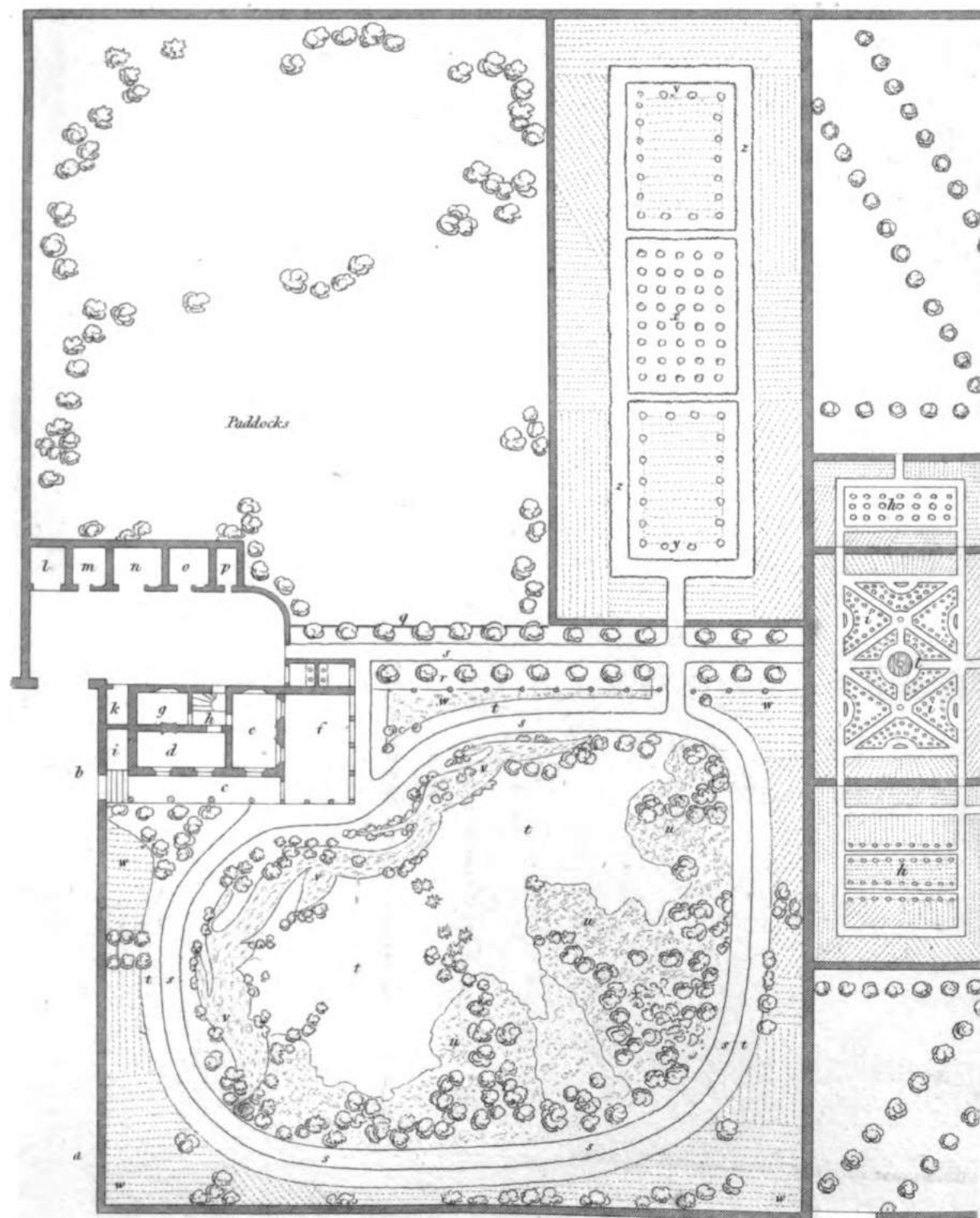


Fig. 2. Villa of 6 Acres

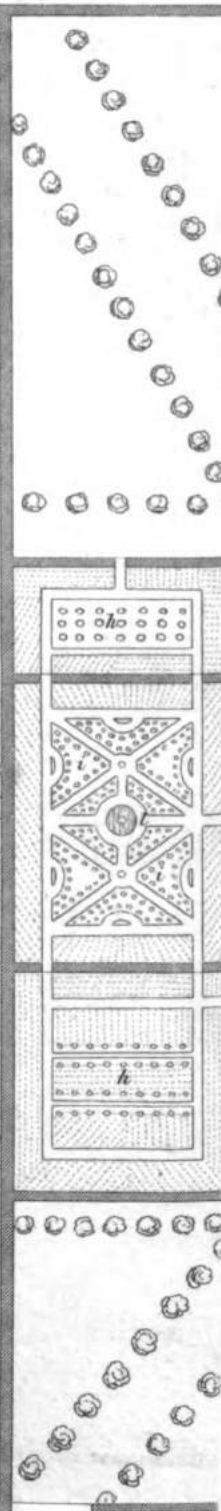
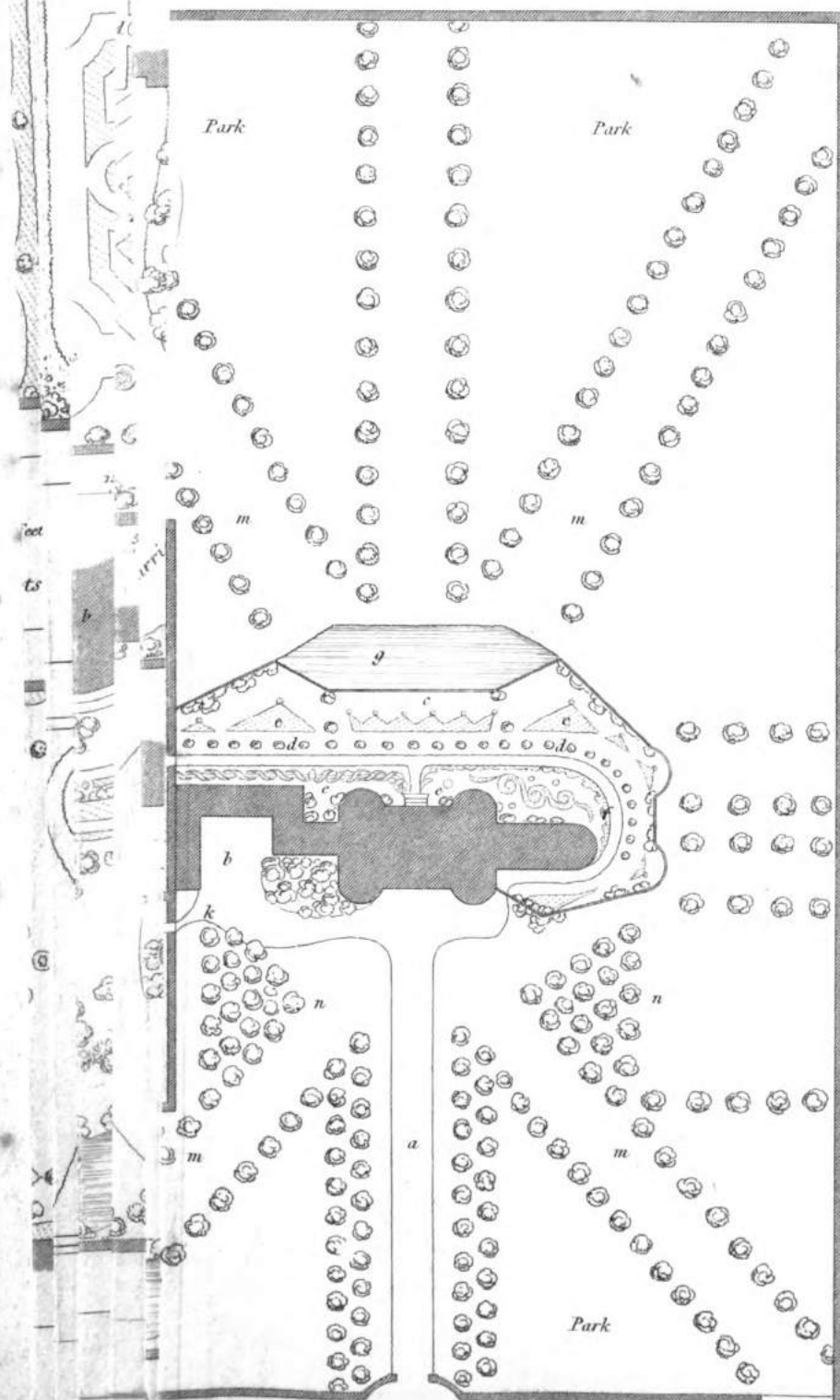


Fig. 2.

in the Geometric Style.

Two Villas in the Modern Style

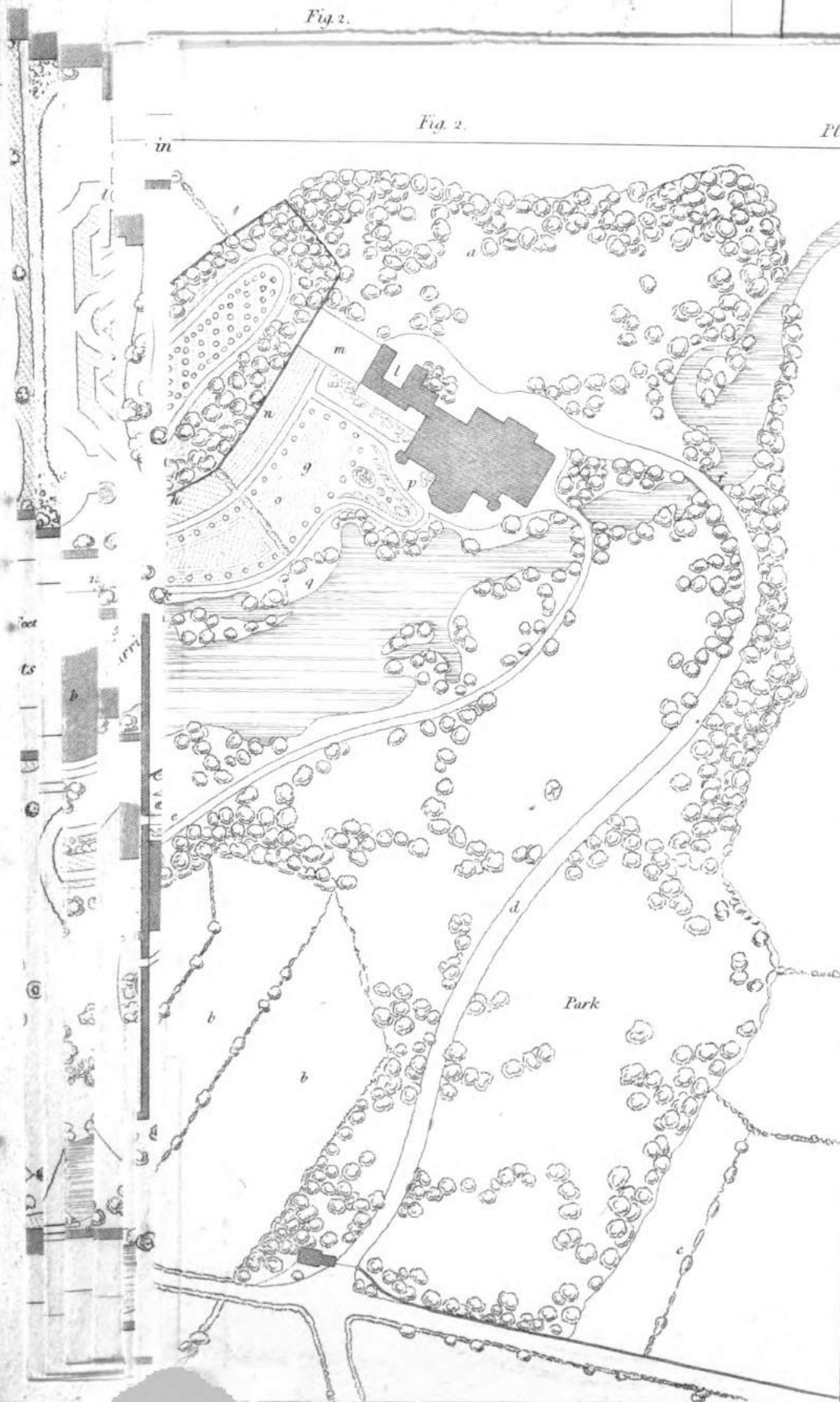
Fig. 1.



Fig. 2.

Fig. 2.

Pl. 7.



Design for laying out 60 acres in a dull flat with

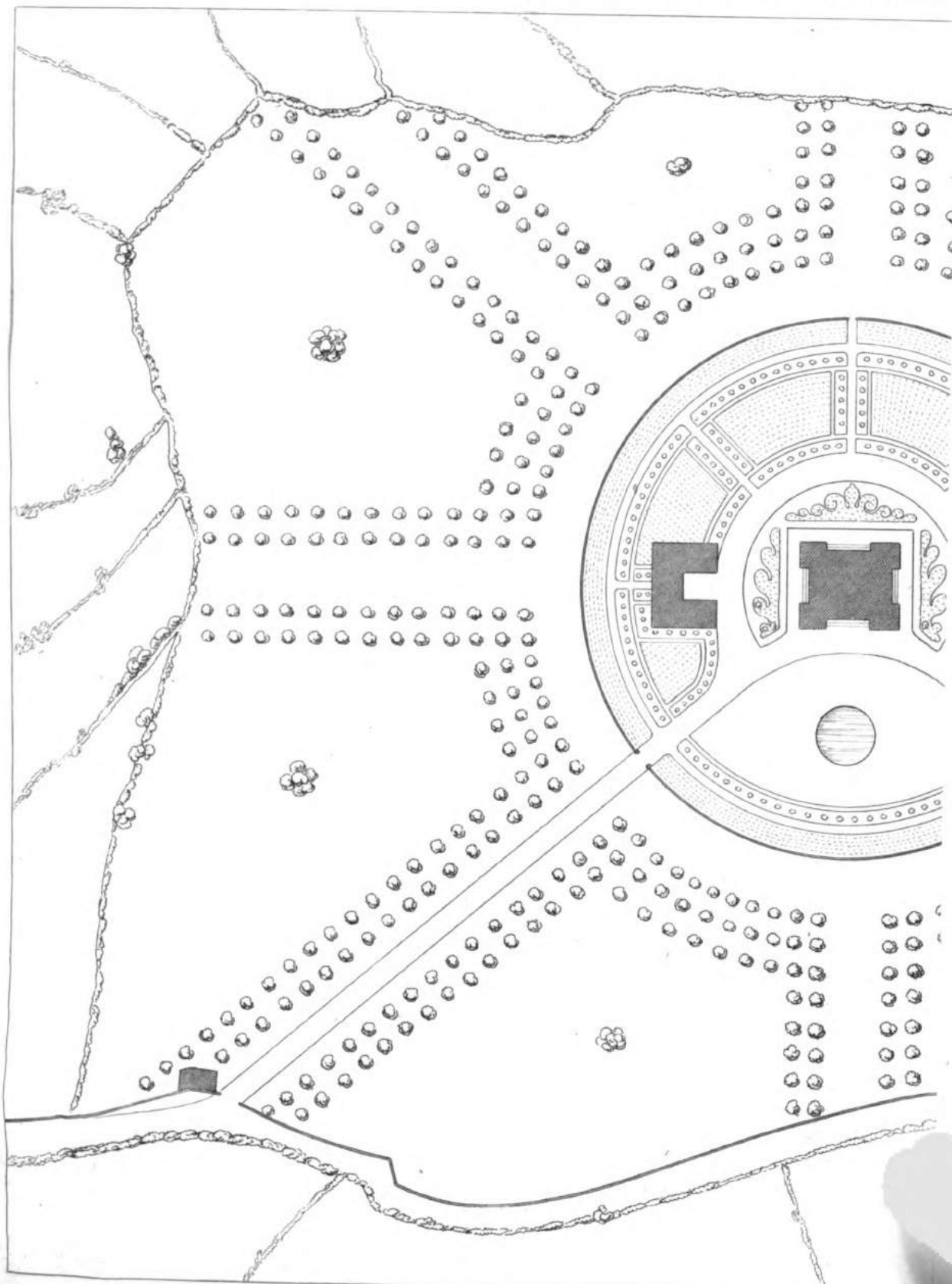


Fig. 2.

no distant prospects.

Pl. 4

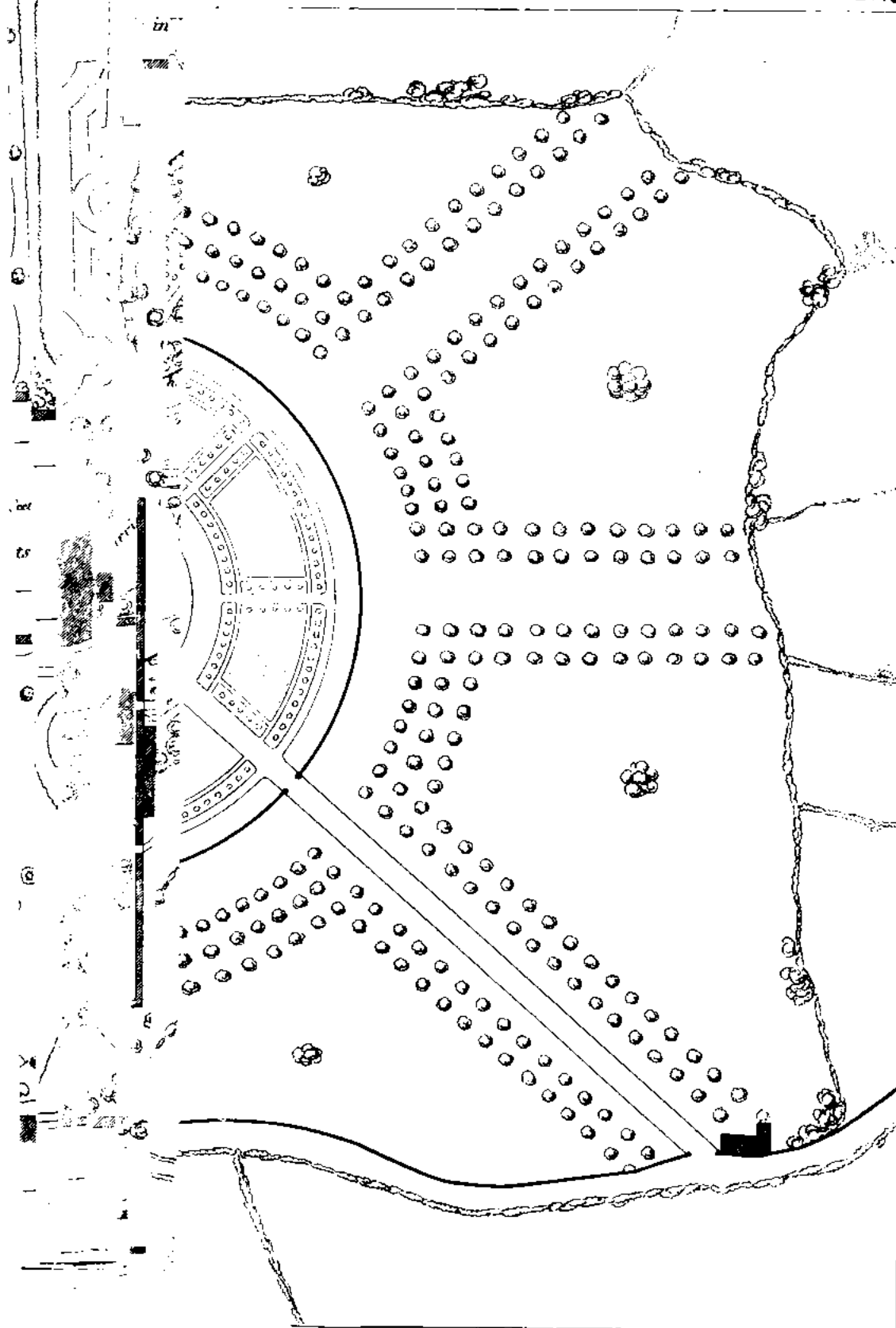


Fig. 1. French Parterre.

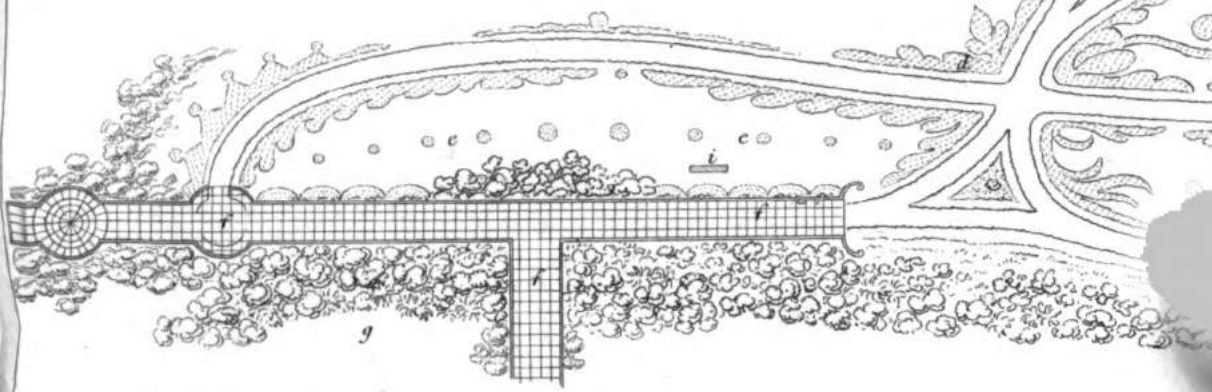
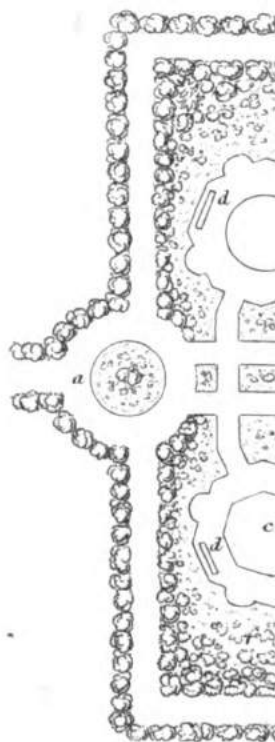
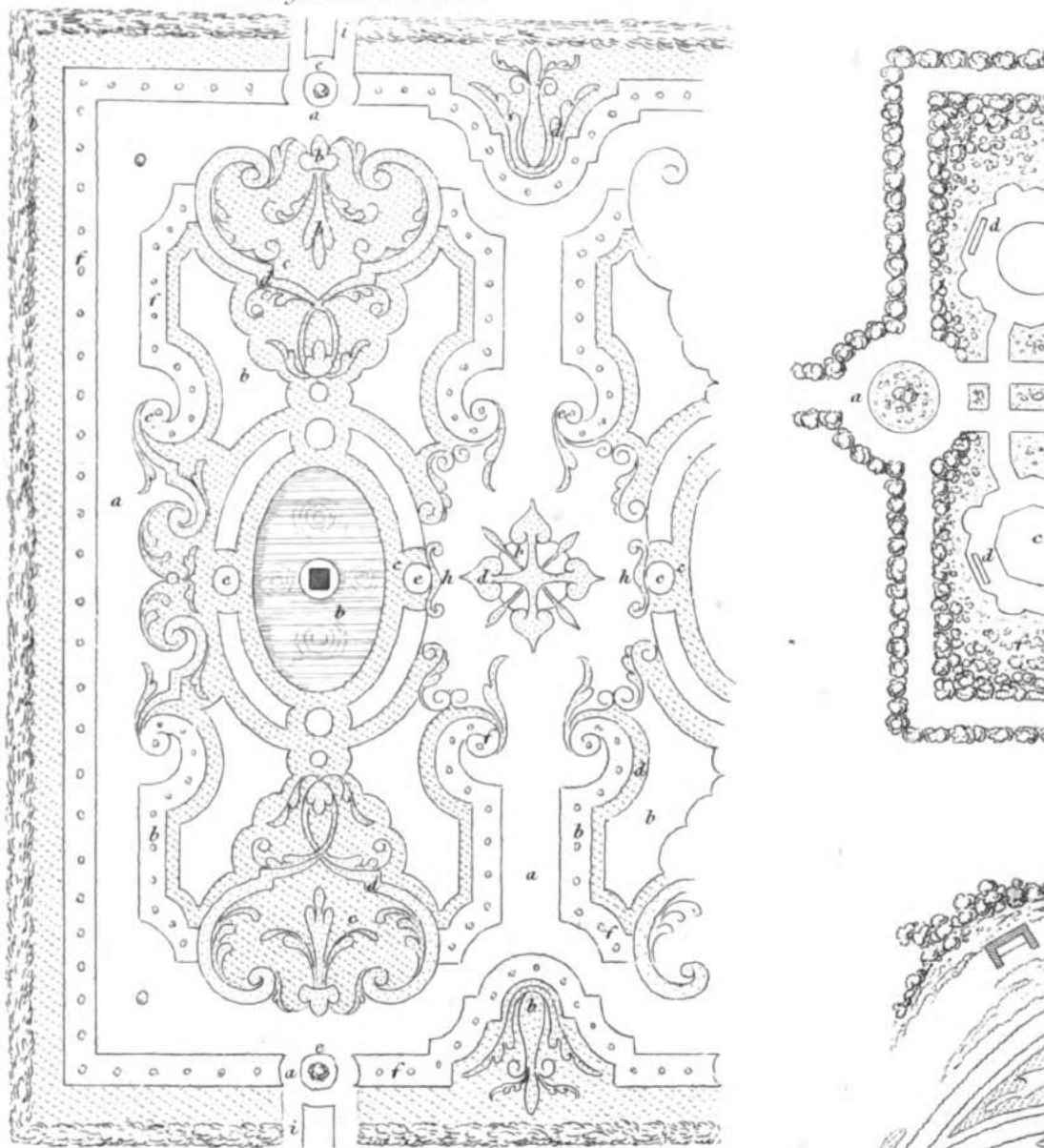


Fig. 1.

no de.

Pl.

Fig. 2. Old English Parterre.

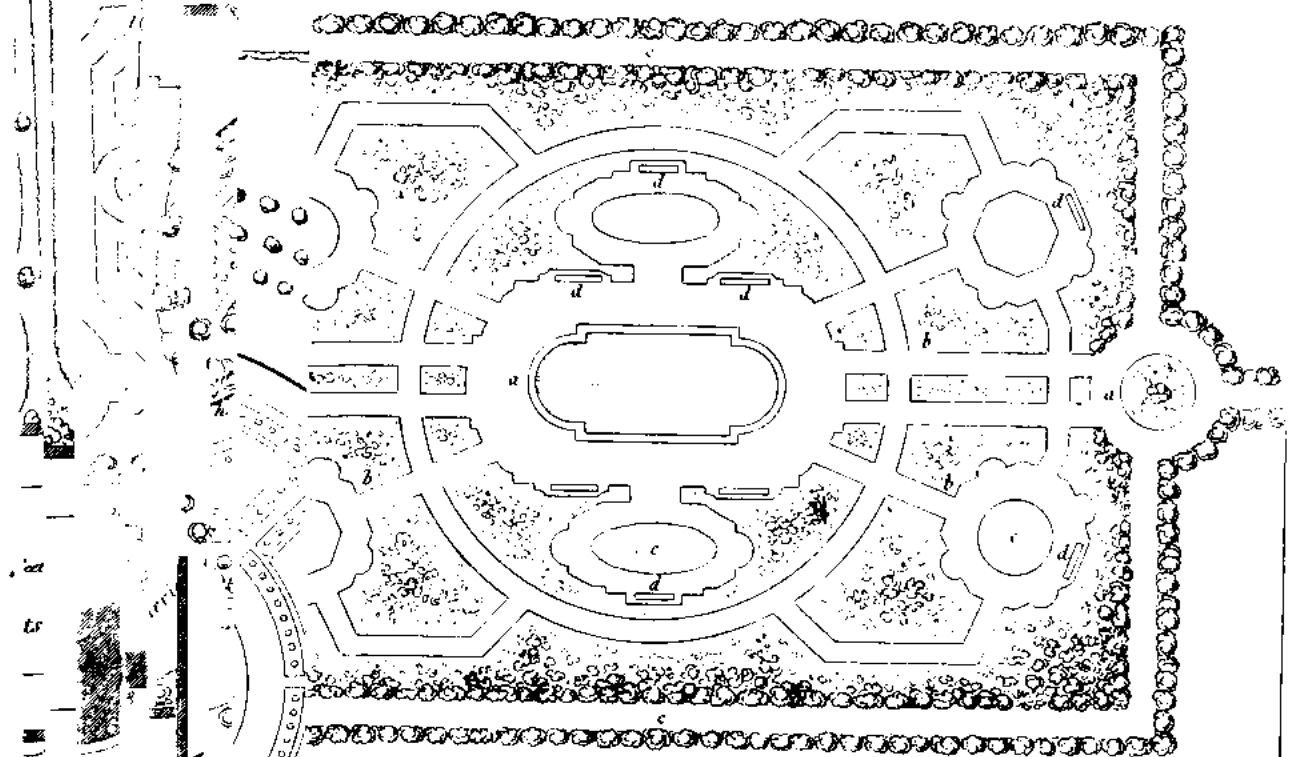
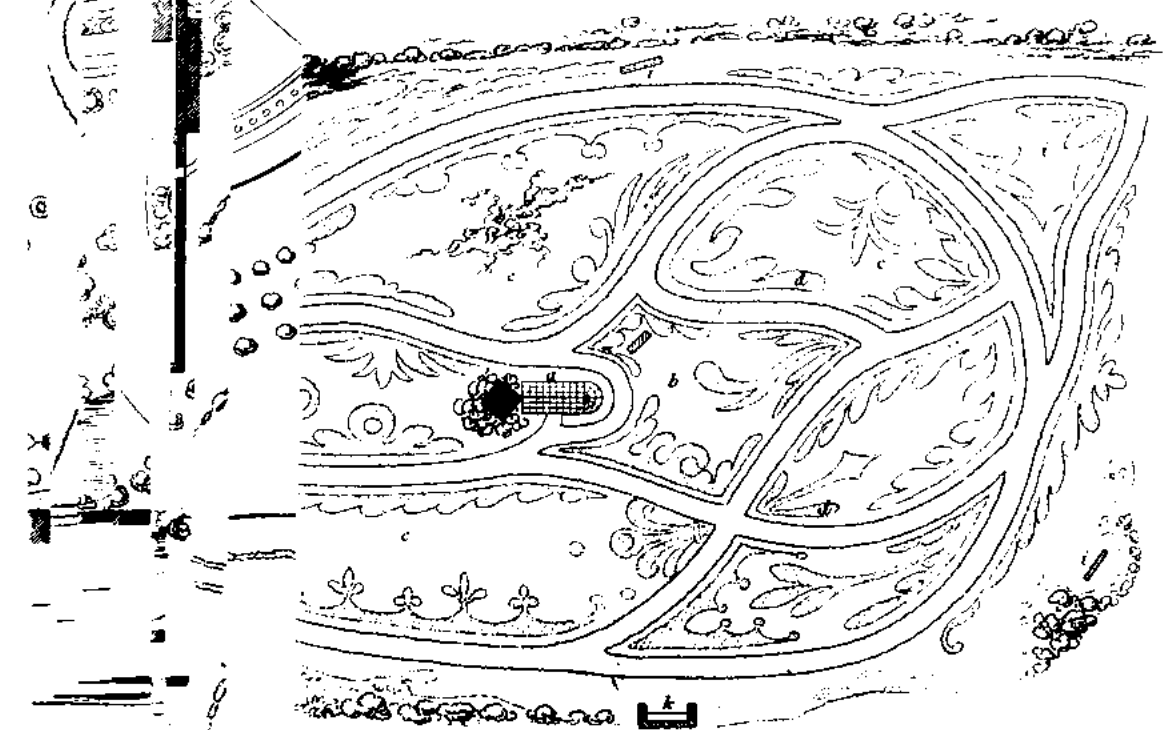


Fig. 3. Modern English Parterre.





Original fly leaf gone.

Revised with as close a
watch as possible



YE 1933

